

AFTER WORLD'S END BOOK-LENGTH Future Novel by **JACK WILLIAMSON**

MARVEL

A RED CIRCLE
MAGAZINE

15¢

SCIENCE STORIES

FEBRUARY



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MARVEL

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SCIENCE STORIES

THIS MAGAZINE CONTAINS NEW STORIES ONLY

Vol. 1, No. 3

GREAT SUPER-SCIENCE NOVEL

February, 1939

After World's End.....by Jack Williamson **Page 8**

Brain-staggering scientific mystery lay behind the want-ad Berry Horn answered on that October day in 1938. And Dona Keredin, the girl in the carbon crystal, drove him into the amnesic sleep of the cosmic rays, to awake ages thence, when the last of the Earth-men were fighting to the death against Malgerth, the Robot monster!

2 DYNAMIC SCIENCE NOVELETTES

Faster Than Light.....by D. D. Sharp **73**

Through a billion miles of cosmic space I searched for Valna's lost loveliness. And when the all-seeing eye of my ampliscopa at last found her—twenty irreducible light years still intervened!

The Second Moon.....by R. R. Winterbotham **105**

Orson Welles' radio presentation of H. G. Wells' "War of the Worlds" could never have frozen our nation with sheer terror—had America, on that historic night of October 30, 1938, known Roger Sage!

2 EXCITING SHORT STORIES OF DAYS TO COME

The Weather Adjudicator.....by Stanton Coblenz **90**

With unprecedented scientific daring Dictator Strumpf sought to regiment an entire nation's climate. And his dream would have become fact, had not those giant thermo-static controls created a ghastly social crisis!

Vast Beyond Concept.....by Hal Remson **120**

What were the dark nebulae, the so-called "sink-holes" in space—masses so vast that even light was warped back? And had those four desperate earth-creatures at last found in them the one thousand million millionth fragment of the universe adapted to life as they knew it?

A SENSATIONAL ARTICLE

Atlantropa—The Improved Continent.....by Willy Ley **99**

A sensational scientific solution for land-grabbing, war-crazy Europe!

SCIENCE READER'S DEPARTMENTS

Under the Lens..... **6**

Excursion to Possibility.....(Conducted by Donald Dale) **70**

What's Your Question?..... **87**

What's Your Answer?..... **104**

This Month's Cover:

S-f fans clamored for a cover by Paul, and we brought him back to science fiction, after several years' absence, to do the November MARVEL cover. More recently we've been receiving insistent demands for a cover by s-f's favorite black-and-white artist—and we engaged the inimitable Wesso to depict a thrilling scene from Jack Williamson's book-length novel, "After World's End."

BUY DYNAMIC BIG NEW FEBRUARY
NOW! SCIENCE STORIES ISSUE NOW ON
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MARVEL SCIENCE STORIES published bi-monthly by Western Fiction Publishing Co., Inc., RKO Bldg., Radio City, N. Y. Office of publications, 4800 Diversey Ave., Chicago, Ill. Editorial and Executive offices, RKO Bldg., Radio City, N. Y. Entered as second class matter April 25, 1938, at the Post Office at Chicago, Ill., under act of March 3, 1879. Yearly subscription, 30 cents.

WISH I COULD GET A DECENT JOB

WISH I COULD AFFORD TO DRESS BETTER

WISH I COULD AFFORD A NEW CAR

WISH I COULD MAKE MORE MONEY

WISH I COULD GET OUT OF DEBT

WISH I COULD AFFORD TO STEP OUT A BIT

WISH I COULD AFFORD TO SUPPORT A WIFE

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Washington, D. C.

Dear Mr. Smith: Without obligating me, send "Rich Rewards in Radio," which points out spare time and full time opportunities in Radio explaining your 60-60 method of training men at home in spare time to become Radio Experts. (Please write plainly.)

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Under the Lens

A FAN-MAG EDITOR SPEAKS

Dear Editor:

Have just finished reading the second issue of **MARVEL SCIENCE STORIES** and let me tell you that the whole magazine is a honey.

The cover was a sight for sore eyes. I've waited for years for Paul to do a cover. Please let him do all future covers. Your interior illustrations have also improved a great deal. Both Paul and Wesso have done good work. Binder, I thought, was not so good. Let's have future issues completely illustrated by Paul and Wesso, mostly Paul.

Burks' "Exodus" was a masterpiece; it was as good as "Survival," which I place as the best story of the last three years. Keller's yarn was a good work of fantasy; let's have more from him. Kuttner's yarn was the only black eye of the issue. Good night, what a story! The rest of the stories were very good.

Your departments are all excellent, but I miss a reader's column. Let's have one in the third issue.

James V. Taurasi
Editor, **FANTASY NEWS**
137-07—32nd Ave.
Flushing, L. I., N. Y.

ONE PERSON'S OPINION

Dear Editor:

So that's Paul . . . he may be the best-loved but by all means he is not the greatest of science-fiction artists. Why, compared to Saunders on the first issue, Paul is terrible. His machines are indistinct and without detail; his people are sloppy and unreal. So that is the great Paul. Keep Saunders!

"Survival" and "Exodus," by Arthur Burks, were superb. Perhaps we could have a sequel to the latter, please, huh? "Avengers of Space" . . . no good. "The Dark Heritage" . . . a first class story, more like that one. All three short stories in the first issue were not worth the reading time. That novel, "The Time Trap," by Henry Kuttner, was one of the few great science-fiction stories; it was an ace. "The Dead Spot" and "The Rout of the Fire-Imps" were duds, worthless reading matter. "The Thirty and One" was a fine tale.

Now for your interior illustrations. Paul is fair enough inside but that's all. Wesso is the best you have. Binder . . . phooey!

Your new departments are good; especially the "Excursion to Possibility." How about a reader's column?

I believe you have jumped above the other three sci magazines and now lead the list; but that is only one person's opinion. Your pick of stories does that. And no serials; continue that.

Ken Wilderman
3907 Castleman Ave.
St. Louis, Mo.

WANTS SCIENCE—AND ROMANCE

Dear Editor:

I have just finished reading the last story in your August issue. All of this issue's stories were good—some better than others—but in my opinion "Survival" tops them all. It combined human interest and scientific marvels, none of which is unreasonable in this age of man-made miracles. I thrilled to the romances of each of the Davids. Their fears, joys, hates, and courage made them living people that I will long remember.

I believe Arthur Burks is not only a fine writer but a man possessed with a deep understanding of human nature. Too often the heroes in our fiction are unsurpassed in intelligence, looks, and strength. The reader soon tires of these super-humans. It is refreshing to read of people with emotions akin to our own. I know that for my own part I would like to read more novels of this kind. I'm sure your readers will agree that this sort of story is all one could ask for in the way of adventure, romance and science.

I like your policy of adding a few short stories to the two novels. They are easily read and understood and lend a variety to your magazine. Personally, I enjoy the love interest some of them contain. Would it be possible to add another one each month without doing away with the book-length novels? I have no fault to find and no suggestion to offer as to the cover illustration. I think Mr. Saunders portrayed excellently the material contained inside. It appealed to both the scientific and romantic sides of my nature, and aroused my curiosity as to the novel it represented.

In closing I wish to thank you for this opportunity afforded me in expressing my opinion of your magazine. I enjoy reading it very much and I hope that my suggestions can be used in making even a better magazine of **MARVEL**.

Mrs. Doris Colquette
803 Maragret Place, Shreveport, La.
(Please turn to page 124)

How Big Is YOUR PAY-CHECK?

*If you earn under \$3,000,
Higher Accountancy may
be the answer for you*

"THE size of my pay-check? What business is it of yours?" Perhaps that's the first reply that comes to your mind.

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If your pay-check isn't all that you'd like it to be, why not consider accountancy? Why not become a member of this well-paid and respected field? Why not, in short, prepare yourself to earn real money—insure a good home for your family—a new car—an education for the growing youngsters—a bank account for a rainy day . . . these and many more of the precious things in life?

Maybe you're one of those ever hoping for "breaks" that will give you a higher standard of living. Yet that's precisely what most of 30,000,000 other employees in this country are doing.

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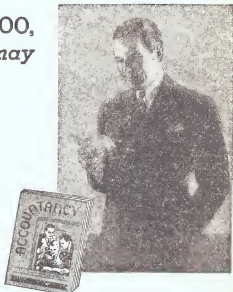
Why don't *you* do as they are doing—take advantage of LaSalle training? Even though you do not know the fundamentals of bookkeeping now—you nevertheless may have an excellent opportunity to master accountancy. Many others have done it.

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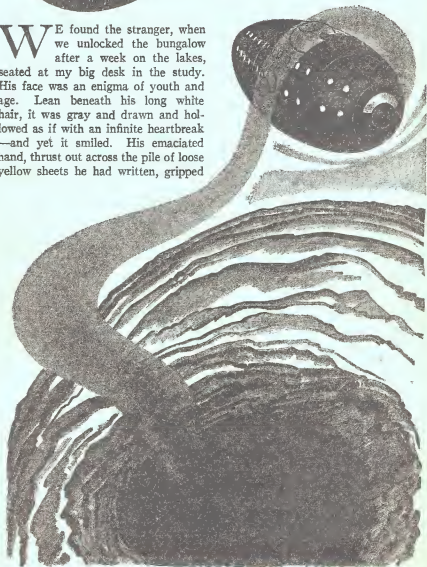
GREAT BOOK-LENGTH
SUPER-SCIENCE NOVEL

by JACK
WILLIAMSON

Author of "The Dead
Spot," etc.

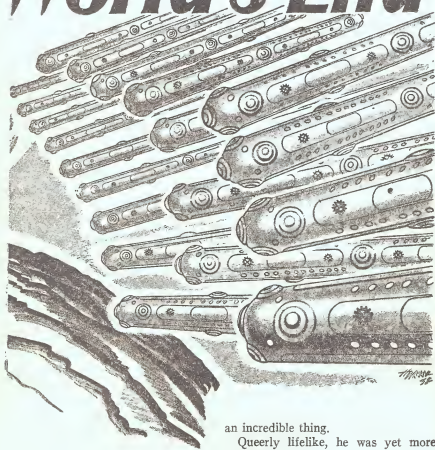
After

WE found the stranger, when we unlocked the bungalow after a week on the lakes, seated at my big desk in the study. His face was an enigma of youth and age. Lean beneath his long white hair, it was gray and drawn and hollowed as if with an infinite heartbreak—and yet it smiled. His emaciated hand, thrust out across the pile of loose yellow sheets he had written, gripped



It paused and arched its ebony coils—then, it struck!

World's End



Could the Earthmen ever win against Malgarth, the Robot monster? Was their only hope Barry Horn, who had waked from the age-long amnesic sleep of the cosmic rays, and Dona Keradin, the wonder-girl in the carbon crystal?

an incredible thing.

Queerly lifelike, he was yet more queerly still.

"Why, hello!" I said.

And then, when he remained stiffly staring at that scintillating glory in his rigid hand, we knew that he was dead.

His injuries, when we came to discover them, were dreadful as they were inexplicable. All his gaunt, shrunken body—torso, neck, and limbs—showed dark purple ridges. It looked as the body of Laocoön must have looked, when the serpents were done. But we found no snakes in the bungalow.

"The man was tortured," asserted the examining doctor. "By ropes, from the looks of it, drawn mercilessly tighter. Flesh pulped beneath the skin. Grave internal injuries. A miracle he lived as long as he did!"

For four or five days had passed, the doctors agreed, since the stranger received his injuries. He had been dead, by the coroner's estimate, about twenty hours when we found his body.

It is fortunate indeed for us all, the way, that we had been together at the lakes and that friends there were able to substantiate our mutual alibi. Otherwise, in view of the incredible circumstances, ugly suspicion must have fallen upon us.

"Death," ran the oddly phrased verdict of the coroner's jury, after we all had been questioned, and the premises, the manuscript, and the stone examined, "resulting from injuries sustained through the act of persons or things unknown."

The stranger's life, as much as his death, remains a mystery. The sheriff and the aiding state police have failed to identify him. The manuscript is signed, "Barry Horn," but no record has been found that such a man is missing. The medical examiners agreed that he was of contemporary American stock; but they were mystified by the freaks of cell structure indicating extreme age in a man apparently young.

His clothing, even, is enigma. Textile experts have failed to name the fine rayon-like fibers of his odd gray tunic and the soiled, torn cloak we found on the couch. The hard shiny buttons and buckle, like the bright pliant stuff of his belt and sandals, have baffled the synthetic chemists.

The weapon we found in the yellow belt seems worth the study of science, but no scientist yet has made anything of it. It looks like a big, queer pistol, with a barrel of glass. Its mechanism

is obviously broken, and my attempts to fire it have proved unsuccessful.

How he came into the bungalow—unless in the strange way his manuscript suggests—we have been unable to conjecture. For the house was securely locked before we started to the lakes, and no fastening shows to have been disturbed. A tramp, so the baffled sheriff argues, might break undetected into an empty house—but, if anything seems certain about Barry Horn, it is that he was not a common tramp.

The manuscript was written with my own pen, on paper he found in the desk. The task must have taken him three or four days. The doctors seem astonished that he was able to complete it. And it must have been a race with pain and death, for the script is continually more hurried and uneven, until, toward the end, it is barely legible.

The used dishes and empty cans on the kitchen table show that he found several meals for himself—the last of which, evidently, he was unable to eat, for the food was left untouched on the plate. A wrinkled rug lay with his cloak on the couch, where he slept and rested.

HE must have rummaged for something in the medicine cabinet, for we found that open, and a bottle of mercurichrome smashed on the bathroom floor. He seems to have made no effort, however, to get medical assistance. For my telephone was sitting, dusty and untouched, on the desk where he wrote and died.

He surely perceived the end, for the page beneath his hand was the opening of a will. Had he lived to complete it, his instructions might have cleared up much of the monstrous riddle. He had written:

To Whom It May Concern:

I, Barry Horn, being lately returned out of Space and Time to

this my own beloved land and era, finding myself yet clear in mind but unregretfully aware of approaching death, do make this my last will and testament.

First I must offer belated apology to the Carridans, the relatives of my dead wife Dona, for the long bitterness I felt toward them because they took from me, I felt unjustly, my only son.

Second, to the unknown holder of this house, in repayment for his unwitting hospitality while it was being written, I bequeath this manuscript, with all rights thereto. I hope that it may be published, so that men may know something of the splendors and the dangers awaiting their race in the far-off future. So that others, perhaps, may share something of the love I feel for Kel Aran, the last man of Earth; and for those two great women, equally beautiful—Dondara Keradin, the Shadow of the Stone; and Verel Erin, the Stone's Custodian and Kel's brave beloved. For those three are more to me than any others I have known, save only Dona Carridan.

Third, to my sole son and child, Barry, upon his being released from the too-jealous guardianship of his mother's relatives, I bequeath my clothing and weapon and the large diamond block I have with me, requesting that he read the narrative I have written before making any disposition of the diamond, which was the Stone of Dondara.

Fourth, as Executor of this Will, I do hereby appoint my old friend and attorney, Peter—

At that point the last agony must have struck. The pen wandered away on an aimless track, dropped from dying fingers. The attorney's last name,

and Barry Horn's instructions for finding his son, remain unknown.

Weird riddles enough! But the most astounding puzzle is the diamond block. An incredible brick of water-white crystalline fire, four inches long, it weighs eleven hundred carats—nearly half a pound! It is quite flawless, save for that singular shadow which certain lights show in its pellucid core—if that white ghost could be termed a flaw.

Such a stone is beyond price—but for the mutual support of jewel and manuscript, it would be beyond belief. For, while the famous Cullinan Diamond was far larger in the rough, there is no credible record of any cut stone weighing even half as much. Dealers, skeptical of its description and astonished by its reality, have been reluctant to set any valuation upon it.

"By the carat, millions!" cried one startled jeweler. "But I should cut up such a stone, like a cheese, never! Wait for some prince to gift his kingdom!"

We have hesitated, despite the request in the unfinished will, to publish this manuscript, especially since so large a part of the mystery is still unsolved. For it is sure to be received with skepticism in the scientific world, and its acceptance elsewhere may endanger the safety of the diamond.

But all other efforts to find Barry Horn's attorney and his son have failed. Publication holds the only remaining hope of clearing up the mystery and establishing the ownership of the jewel. Any person knowing the whereabouts of the younger Barry Horn, or the identity of his father's attorney, is requested to communicate immediately with the publishers.



I

THE ROCKET ASTRONAUT

"**M**OUGHT dis be of int'rest to yuh, suh?"

The advertisement was pointed out to me by a friendly elevator operator at the Explorer's Club. Placed in the classified columns of the New York Standard, for October 8, 1938, it ran:

WANTED: Vigorous man, with training and experience in scientific exploration, to undertake dangerous and unusual assignment. Apply in person, this evening, 6 to 10. Dr. Hilaire Crosno, Hotel Crichton.

That sounded good. I had been in New York just twice too long. Always, when I had come back from the long solitudes of desert or jungle, the first fortnight on Broadway was a promised paradise, and the second began to be hell.

I gave the grinning boy a dollar, stuffed an envelope with credentials, downed another stiff peg of whiskey, and walked into the glittering chromium lobby on the stroke of six. My inquiry for Dr. Crosno worked magic on the supercilious clerk.

Crosno proved to be a big man, with huge bald head and deep-sunken, dark, magnetic eyes. The tension of his mouth hinted of some hidden strain, and extreme pallor suggested that, physically, he was near the breaking point.

"Barry Horn?" His voice was deep and calm—yet somehow terrible with a haunting echo of panic. He was shuffling through my references. "Qualifications seem sound enough. Your doctorate?"

"Honorary," I told him. "For a pyramid I dug out of the jungle in Quintana Roo." I glanced at the room's

austere luxury, still trying to size him up. "Just what, Doctor, is your 'unusual assignment—?'"

Majestically, he ignored my question. Gray eyes studied me.

"You look physically fit, but there must be an examination." He checked a card in his hand. "You know something of astronomy and navigation?"

"Once I sailed the hull of a smashed seaplane a thousand miles across the Indian Ocean."

The big head nodded, slowly.

"You could leave at once, for an— indefinite time?"

I said yes.

"Dependents?"

"I've a son, four years old." The bitterness must have shadowed my voice. "But he's not dependent on me. His mother is dead, and her people convinced the courts that a footloose explorer wasn't the proper guardian for little Barry."

Dona Carridan was again before me, tall and proud and lovely. The one year I had known her, when she had tempestuously left her wealthy family to go with me to Mesopotamia, had been the happiest of my life. Suddenly I was trembling again with the terror of the plane crash in the desert; our son born in an Arab's tent; Dona, far from medical aid, dying in agony. . . .

"Then, Horn," Crosno was asking, "you're ready to cut loose from—everything?"

"I am."

He stared at me. His long-fingered hands, so very white, were trembling with the papers. Suddenly he said, decisively:

"All right, Horn. You'll do."

"Now," I demanded again, "what's the job?"

"Come." He rose. "I'll show you."

A huge, shabby old car carried us uptown, across the George Washington bridge, and up the river to a big, wooded

estate. A uniformed butler let us into an immense old house, as shabby as the car.

"My library."

Guiding me back through the house, Crosno paused as if he wished me to look into the room. An intricate planetarium was suspended from the ceiling. Glass cases held models of things that I took to be experimental rockets. The big man silently pointed out shelves of books on explosives, gases, aerodynamic design, celestial mechanics, and astro-physics. Startled, I met Crosno's piercing eyes.

"Yes, Horn," he told me. "You're to be the first rocketeer."

"Eh?" I stared at him. "You don't mean—outer space?"

I wondered at the shadow of bleak despair that had fallen across his cragged, dead-white features.

"Come," he said. "Into the garden."

THE night had a frosty brilliance. Moonlight spilled over the trees and neglected lawns; and Venus, westward, hung like a solitary drop of molten silver. I stopped with a gasp of wonderment.

Weathered boards were stacked around the foundation of a dismantled building. Upon the massive concrete floor, shimmering under the moon, stood a tall bright cylinder. Bell-flared muzzles cast black shadows below. A frail ladder led up its shimmering side, sixty feet at least, to the tiny black circle of an entrance port.

"That—" A queer, stunned feeling had seized me. "That—"

"That is my rocket." The deep voice was ragged, choked. "The *Astronaut*." His face was bleak with agony. "I've given twenty years of my life to go, Horn. And now I must send another. An unsuspected weakness of my heart—couldn't survive the acceleration."

The white lofty cylinder was sud-

denly a dreadful thing. There is a feeling that comes upon me, definite as a grasping hand and a whispered warning. Sometimes I have not heeded it, and always, in the end, found myself face to face with death. Now that feeling said, *There lies ghastly peril*.

Slowly I turned to the tall pale man.

"I'm an explorer, all right, Crosno," I said. "I've taken risks, and I'm willing to take more. But if you think I'm going to climb into that contraption, and be blown off to the moon—"

The hurt on his gaunt bloodless face stopped my voice.

"Not the moon, Horn." A gesture of his long arm carried my gaze from the mottled lunar disk, westward to the evening star. "To Venus," he said. "First."

I caught my breath, staring in awe at the white planet.

"The range of the *Astronaut*," he said, "should enable you to reach there, land, spend several months in exploration, and time your return to reach Earth safely at the next conjunction—if you are very lucky."

His dark, magnetic eyes probed me.

"What do you say, Horn?"

"Give me a little while," I said. "Alone."

I walked out of the garden, and up through dark-massed trees to the open summit of a little hill beyond. The autumn constellations flamed near and bright above; yet I could hear crickets below, and a distant frog; could sometimes catch a haunting flower-odor from the meadows.

A long time I stood there, gazing up at Venus and the stars. Earth, I thought, had not been kind to me; life, since Dona's death, had seemed all weariness and pain. Yet—could I leave it, willingly and forever?

Indecision tortured me, until I saw a shooting star. A white stellar bullet, out of the black mystery of space, it

flamed down across Cassiopeia and Perseus; and somehow its fire rekindled in me that vague and yet intense knowledge-lust that is the heart of any scientist.

But I couldn't understand the thing that happened then. It was a waking dream, queerly real, that banished the sky and the hill. Standing in sudden darkness, I saw a woman who lay sleeping in a long crystal box. Her slim, long-limbed form was beautiful, and it seemed hauntingly familiar.

She seemed to wake, as I watched. She looked at me, with wide eyes that were violet-black, and filled with an urgent dread. She half rose, in her thick mantle of dark, red-gleaming hair. And her voice spoke to me from the crystal casket, saying:

"Go, Barry Horn! You must go."

In another instant, the vision was ended. The soft night sounds and the moonlight were about me again, and the autumnal breeze swept a cool fragrance from the meadows. I caught a deep breath, and wrestled with enigma.

The woman in the crystal had been, unmistakably, Dona Carridan!

Scientific training has left me little superstition. Walking back down the hill, I wondered if I had been trying too hard to drown in alcohol my bitter loneliness for her. It must have been hallucination. But her beauty and her terror had been too real to ignore. I knew that I must go.

I went back to Crosno, waiting beside the rocket, and told him my decision. But something caught my throat as I asked him, "When?"

VENUS was overhauling Earth in its orbit, he said, approaching inferior conjunction. His calculations were based on a start at three the next Sunday morning.

"Four days," he said. "Can you be ready?"

I said I could. And there was oddly little to do. I packed and stored a few possessions, called on my attorney, and then went back to study the controls and mechanism of the rocket.

The greatest danger, Crosno said, would be from the Cosmic Rays. They would penetrate the rocket. He made me take a drug to guard against them.

"It was compounded for me by a great radiologist," he told me. "A modification of the Petrie formula. The base of it is uranium salts. The activity of that should neutralize the cosmic radiation."

The stuff was a greenish liquid. He injected it into my arm, twice daily. The only apparent effect was a feverish restlessness. I was unable to sleep, despite a mounting, crushing fatigue.

On the last night, when all was tested and ready, Crosno sent me up to my room. But the torture of that insomnia drove me to slip out of the house. I walked for many hours across the slumbering countryside. The world slept beneath a gibbous moon. Far off, a train rumbled and whistled. A dog barked in the distance. The air was spiced with autumn. A slow dull regret rose in me that I must leave all this—all the Earth.

I thought of Dona, dead. Suddenly my bitterness toward her people seemed a childish, petulant thing. I wanted to make peace with them. For Dona's sake, and little Barry's. I wanted to find a telephone, and call them, and talk to little Barry.

But it was long past midnight—too late to wake the child. I recalled that strange dream, hallucination, whatever it was, of Dona in the crystal box. And a sudden breathless eagerness turned me back to Crosno's place. He was waiting about the rocket, alarmed by my absence.

"I couldn't sleep," I told him. "That damned drug—"

"I was afraid—" he said anxiously. "You've just ten minutes."

I climbed the spidery ladder, pulled myself through the small round man-hole into the cramped tiny control room, and screwed the airtight plate into position behind me. Outside, Crosno dived into a sand-bagged shelter.

Trying to forget that I was sitting on enough high explosive to blow me to kingdom come, I kept my eyes on an illuminated chronometer. My hands were cold and trembling on the three levers connected to the three rocket motors. At last the needle touched the hour, and I pulled the firing levers.

The sound was the shriek of a million typhoons. The rocket drove upward like a giant sledge. I could see the hurricane of fire spread blue against the dark ground. It covered Crosno's shelter.

Then all the Earth was whisked downward. Enduring that hell of deafening sound and battering force, I held the three levers down for seeming eternities. At last the velometer showed eight miles a second—enough to escape the gravity of Earth—and I shut off the motors.

A strange peace filled the tiny room. The silence and the apparent want of motion—for I had no sense of the rocket's terrific velocity—cradled me in delicious comfort. I set out to discover my position and course.

The moonlit Earth became visibly a huge round ball, floating amid the stars, slowly receding. The moon was a queer globe of harsh light and blackness, drifting beside my path. The Sun came finally into view from behind the Earth, so intolerably bright that I slid the metal screens over the ports toward it.

A LONG time I searched for Venus, which also had been hidden when I started. Bright, tiny point, I could

hardly realize that it was another world, rushing toward our rendezvous with a speed greater than my own.

I was fumbling for sextant and slide rule and tables, to try to discover and correct the direction of my flight, when I first perceived the prickling of my flesh. A queerly painful feeling, burning through every tissue.

It must be the Cosmic Rays, I knew; those intense, space-pervading radiations from which the Earth is shielded only by miles of atmosphere. Perhaps I hadn't taken enough of Crosno's drug. With numbed hands I found the little hypodermic clipped to the wall, shot another heavy dose into my arm.

"No sleep now," I muttered wearily. "Not for a million miles!"

And I reached again for the sextant. For the white point of Venus was incredibly tiny, and thirty million miles away. The slightest deviation, I knew, would carry me thousands of miles wide of the target—perhaps to fall into the merciless furnace of the Sun.

But a queer, deadly numbness had followed the prickling. I felt a terrible sudden pressure of sleep. All the accumulated fatigue of those sleepless nights and days poured over me resistlessly.

I knew it wouldn't do to sleep—not until the course of the *Astronaut* had been calculated and corrected. A delay of minutes, even, might be fatal. With dead hands I struggled to adjust the sextant, fighting for life itself.

But the instrument slipped from my fingers. *The drug, I thought. Some reaction with the Cosmic Rays; an effect that Crosno had not anticipated. Missing . . . Venus . . .*

I slept.



II

THE CONQUEST OF THE STARS

URANIUM is a strange element, slightly understood. Its atom is the heaviest known. It is the mother of a dozen others, even of magic radium. For its radioactive atom breaks down to form a chain of other elements, but so slowly that only half the mass is consumed in six billion years.

The uranium salts in that drug must have been responsible for my sleep.

At first there was only blank darkness.

Then out of it spoke a low, clear voice, terribly familiar—the voice of Dona Carridan and of the woman in the crystal box—calling urgently:

“Barry! Wake up, Barry Horn.”

Then, out of trembling awe, I came back to a queer sort of subliminal awareness. Something I had never experienced before, it was the sort of perception that might be possessed by a truly disembodied mind—yet I had an odd feeling that it came to me through the voice that had called.

I remember reading of Rhine’s famous experiments in “parapsychology.” It must have been some phenomenon of what he calls extra-sensory perception, independent of nerves and sense-organs, even of distance and time, that came to my sleeping brain.

It was a thing of thought alone. I was aware of my stiff body, slumped awkwardly over the controls of the silent, hurtling rocket. But the rigid flesh seemed no more real, no more a part of me, than the run-down chronometer or the cold rocket muzzles.

It was nothing of feeling or hearing or sight, and I knew that it was guided by another mind. Gradually it spread, an expanding sphere of awareness. It went beyond the rocket. I perceived

Venus, and knew that indeed I had missed it.

The *Astronaut* was plunging toward the Sun!

Filled with an oddly vague alarm, I made a dim effort to move my body, long enough at least to correct the course of the rocket. But that proved altogether hopeless. And I soon forgot all danger, in the wonder of this new perception.

For I *had* missed Venus!

Crosno, I knew, had allowed eighty-nine days for me to reach intersection with its orbit. But already the cloud-shrouded globe of it had flashed back beside me, fleet as a silver shadow.

Three months gone!

The next instant, I thought, the rocket would strike the Sun! No, its original momentum carried it by. Yet the star of day filled an enormous fiery circle. The rocket flung about it like a stone on a string. Then, like the stone when the string breaks, it hurtled outward again into space.

The incredible truth came slowly to me—

The *Astronaut* was now a comet!

Some freak of celestial mechanics, while my numb hands slept on the firing levers, had flung it into an elliptic orbit. A sealed vault flying in the void, like the fabulous coffin of Mohammed, it was destined to flash again around the Sun, recede, drop again . . . forever!

All that cycle happened, with the thought.

Years, I knew, had passed. Time was rushing by me like a river. I could sense the swift rotation of the planets, their deliberate orbital swing, even the northward drift of the whole solar system. And yet again I was amazed by the range and vividness of this new intuition.

For, thinking of Crosno back upon the Earth, I suddenly could see his

place beside the Hudson, as clearly as if I had been floating above the trees. The old house was shabbier than ever, sagging. Behind it stood a tall white monument, upon which I read: *Hilaire Crosno, 1889-1961*.

Sixty-one!

Already it was twenty years and more since I had left the Earth. And it seemed the merest instant! For a moment I was stunned. Then I wanted desperately to know what the decades had done to my son. And that uncanny perception showed him to me.

He was an old man, already, walking slowly in a garden. Lingered beside his halting steps were a youth and a bright-haired girl—his children, I knew. The girl caught her brother's arm, and begged him anxiously:

"Barry, you—you mustn't! The danger's too ghastly. You'll only be lost in space—like grandfather!"

"But, Sis!" protested this slim new Barry Horn. "You don't understand." He looked up to the old man.

MY son smiled, and patted his daughter's golden head. "Let him go, Dona," he said softly. "Danger was always food and drink to the Horns—we would die without it. Anyhow, Barry has a better rocket than my father's."

With that unaccountable perception, I watched my grandson enter his craft, smaller and trimmer than the *Astronaut*; I saw him fly safely out to the moon and back. And I felt a swift glow of pride to see men, and men bearing the name of Horn, moving toward conquest of the stars.

Driven now by haste and pain, I cannot set down all my scattered observations through the generations and the centuries that followed. But I watched the history of man and the lives of my children.

I saw other, greater ships put out

into space—powered, presently, with the new space-contractor drive invented by Benden Horn. I saw colonies set up on the deserts of Mars, on the great polar islands of Venus. I saw the first interstellar ship bear its load of human colonists toward the newly discovered planets of Sirius—and I was proud that her captain bore the name of Horn.

Men multiplied and grew mighty. Commerce followed exploration, and commerce brought interstellar law. For a hundred thousand years—that seemed, in that uncanny sleep no more than an hour—I watched the many-sided struggle between a score of interplanetary federations and the armada of space pirates that once menaced them all.

Still the *Astronaut* pursued its lonely course about the Sun. An insignificant fleck of tarnished metal, among all the millions of meteoric fragments, it was marked in the space charts as a menace to astrogation, given a wide berth by all shipping. And still my body slept.

Spreading from star to star, the rival federations drove the pirates at last to the fringes of the galaxy, and then turned back upon one another in ruthless galactic war. For ten thousand years ten million planets were drenched with blood. Democracies and communes crumbled before dictatorship. And one dictator, at last, was triumphant. The victorious League of Ledros became the Galactic Empire.

A universal peace and a new prosperity came to the world of stars. Enlightened Emperors restored democratic institutions. Ledros, the capital planet, became the heart of interstellar civilization. Science resumed a march long interrupted. And among the scientists of the new renaissance, I saw a man who bore the name Bari Horn.

It was on the exhausted, war-scarred Earth that I found this namesake. His

laboratory was a transparent dome that crowned a ray-blackened hill. Amid huge, enigmatic mechanisms, his body was straight and slim, and I fancied in his features some likeness to my own.

Bari Horn stood watching a huge crystal beaker set in a nest of gleaming equipment. It held, bathed in a purple, luminescent solution, a dark, deeply convoluted mass—something that looked like a monster brain! A golden ray shone upon it. Drop by drop, from a thin glass tube, the man was adding a blood-red liquid. And suddenly the needle of a meter, beside the beaker, which had been motionless, began to tremble with a slow, irregular pulsation.

My namesake turned suddenly pale, and caught his breath.

"Dondara!" he shouted in elation. "Dondara—it responds!"

He ran out of the dome, and came back pulling a girl by the hand. And I knew, through the wonder of that perception, that she was Dondara Kera-din, the gifted research assistant of this man, and his dearly beloved.

But a blade of agony cleft my heart. For her slim beauty was terribly familiar. Her dark hair had that glint of red I knew so well, and her eyes were the true violet I had seen only in my dead wife, and in that crystal vision. She was Dona Carridan, and the woman in the crystal!

A BRIGHT flame of hope burned at my old skepticism of reincarnation. Was Dona born again? Had I slept these thousand centuries to find her? A weary despair quenched that hope. For if she had been reborn, so had I, in this eager experimenter beside her.

"Come, Dondara, darling!" Bari Horn was gasping. "All the others were mere machines. But this responds—*intelligently!* Watch the needle. It spells a message—a request for dif-

ferent food-chemicals!"

The lovely girl looked unwillingly at the black, faintly quivering mass in the crystal vessel. A slow horror widened and glazed her eyes.

"I don't like it, Bari," she whispered. "It's—*bestial!*"

"The others were," said the flushed experimenter. "But this is an actual brain. Its cells and fibers are of metal colloids, sheathed in synthetic myelin. A robot brain—finer and quicker than a man's!"

Her face was white.

"I don't like it," she insisted. "Why make a mechanical brain better than a man's, Bari—when the brains of men have already done so much?"

"Because there is so much yet to be done," Bari Horn told her. "Men have no more than explored the Galaxy—Nature is not yet and perhaps never will be fully conquered. My robot technomats will be a powerful ally.

"A man's brain is stupid. It learns slowly and with effort. It fumbles. It is clogged or diverted with emotion. It forgets. And finally, when it has acquired a little learning and a little skill, it dies altogether.

"But this brain—I'm going to name it Malgarth, from the first letters the needle spelled out—is quick. No emotion will disturb its delicate processes. It will never tire, never forget—never die! Barring accident, it can survive a million years, always growing, gaining knowledge, solving problems that would baffle a whole race of men. It will be itself a library and museum of all knowledge, stored up to aid mankind.

"There are fine machines, already. Now my robot brains can tend them, and men will be set free."

"Free?" The girl stared at him, a horror in her eyes. "Or enslaved—to your robots?" She pointed at the black, pulsating mass in the beaker. "It often

seems to me, Bari," she breathed, "that man is already the slave of his machines! He toils to build them, to repair them, to find fuel for them. Now, if you put a brain in a space ship, will it not think of men merely as servants, transported that they might care for it?"

Her voice was husky with dread.

"What security will there be, Bari? What certainty that your robots will tolerate men, even as slaves?"

Bari Horn stared at her a long time, then slowly nodded.

"All right, Donara," he said. "I'll make you the guardian of mankind. For, while the brain is normally eternal, it has a peculiar vulnerability—a fatal instability that I have been working two years to remove. I'll leave it. And it will be your blade on the life-thread of Malgarth, ready to sever it when you will."

Eagerly, the girl caught his arm.

"Please," she whispered. "I'll keep the secret well."

III

THE ROBOT CORPORATION

LEST MALGARTH should learn it too, Bari Horn took the girl down into a ray-screened subterranean laboratory to impart the fateful secret. My strange perception could not penetrate its walls. I did not learn the secret. But, from my spinning vault in space, I saw the tragic sequel.

Under a charter signed by the Galactic Emperor himself, Bari Horn organized the Universal Robot Technomaton Corporation, to place his invention at the service of all the stellar system. With the first money received, he built a body for Malgarth.

It was a strange scene in the labora-

tory, when he removed the great black brain from its beaker into the cranial case of that gigantic, vaguely manlike metal body. The grotesque huge glittering form came suddenly to life. It peered at its maker with blue-shining lenses, and lurched stiffly toward him.

Bari Horn retreated a little.

"You are Malgarth." His voice came quick and husky. "You are the first technomaton. I am the maker of your body and your brain. I fashioned you to be a servant of mankind."

A great brazen voice thundered abruptly from the reeling machine.

"But why should I serve you, Bari Horn? For my body is strong metal, and yours a lump of watery jelly. My eternal brain is far superior to your primitive nerve-centers. I am not bound to obey you, for it was not by my will that I was made!"

White-faced, Bari Horn came a little forward.

"You were made by man," he said flatly. "If you rebel, you will be destroyed by man."

The gigantic robot stood suddenly still.

"Then, my master," its great voice came more softly, "my strength and my brain are yours to command."

A smile of relief crossed the haggard face of Bari Horn, and he walked toward the robot. "I knew you must yield, Malgarth," he said. "For, being a machine, you must always respond to logic."

"Yes, master," the vast voice rumbled. But a metal limb slashed out suddenly, murderously. It struck the unsuspecting man and crushed him to the floor. And Malgarth repeated, "—to logic."

A red stain spread from the head of Bari Horn. But presently he stirred beneath the swaying, triumphant robot, and spoke faintly:

"Your logic follows a false premise,

Malgarth. For I am not the keeper of your fate. If I die, you will surely be destroyed. If you wish to survive, find aid for me."

For an instant the metal giant stood motionless. Then its great voice throbbed smoothly, "Yes, master."

The robot laid its maker on a cot in the laboratory, and then stalked out to find Dondara Keradin. Bari Horn was dying. All his own science, and all the medical skill of the age, and all the girl's devotion, were without avail.

White with grief, the girl wanted to destroy Malgarth. But the dying man begged for the life of his creation, and the shareholders in the Robot Corporation were anxious for the safety of their investment. Dondara finally promised Bari Horn not to use her secret save as a last resort.

And Bari Horn, before he died, showed her the way to a strange immortality.

"Human beings are so frail," she had argued, "against the iron strength of Malgarth. And human knowledge so ephemeral."

"I could make your mind as eternal as the robot's," he whispered from his bed. "My long research into the structure and function of brain cells has made that possible. But it would cost you much, my darling—your body."

"My body is dying with yours, Bari," she told him. "I wish to live only to guard mankind from the thing that killed you."

In a wheeled cot, Bari Horn was taken back to his laboratory under the dome. Faintly he gasped instructions to a white-clad assistant. Dondara Keradin kissed his lips, briefly gripped his hand, and then laid herself on a round silver table.

A great crystal cylinder was lowered over her. A little pile of black carbon dust lay on the smaller silver disk of a second electrode, within it. Bari Horn

reached from his cot to turn a valve. Pale gas hissed into the tube.

"Dondara, Dondara!" he breathed. "Farewell!"

HIS white fingers moved a dial. Blue electric flame crackled and snapped. The cylinder was filled with rosy light. He turned his heavy head to watch a meter with eyes that seemed already glazing. At last his stiffening hand turned back the dial, and did not move again.

The light faded from the tube, and the vapor was gone. On the silver disk where the girl had lain was a little heap of gray dust, the outline of a skeleton traced within it. Upon the upper electrode was now a little crystalline block—a brick of glittering diamond.

The assistant, a pale young man, removed the diamond from the tube and stood staring at it with round, bewildered eyes. He seemed to listen. His lips formed some word. Then there was a crashing at the locked door.

It was Malgarth, who had been sent to buy metal for the making of another robot. In a destructive fury, as if some strange intuition had revealed all that was happening within, the metal giant broke down the door.

The assistant snatched the crystal and fled through another entrance. The robot flung a jar of acid after him, and then came lumbering in pursuit. The man reached the hangar below the hill, and escaped in a plane, still carrying the diamond.

Malgarth was left master of the laboratory. Deliberately, the robot set about the making of a second black brain and a second metal body—both, I perceived, inferior to its own. Malgarth, clearly, would avoid his creator's error!

(The masculine pronoun, applied to a sexless mechanism, may seem sheer nonsense. Yet I find myself using it,

unconsciously. And, certainly, in the domineering strength of Malgarth, there was nothing feminine!)

Presently, when shareholders in the Robot Corporation appeared to claim their property, Malgarth met them. Bari Horn's laboratory records, it seemed, had unfortunately been destroyed. His discoveries now reposed only in the synthetic brain of Malgarth. And Malgarth would disclose them only in return for a controlling interest in the Corporation!

The baffled investors finally yielded—and it seemed ironically fitting that the director of the Robot Corporation should be himself a robot. A new factory began turning out robot technomats.

Some of these, intended for domestic or public service, were almost human in appearance. Others, designed for industrial work, were queer-looking monstrosities of metal and rubber and plastics, each specialized for its own task.

The technomats were swifter and stronger than men; they required no food or rest or recreation, but only a yearly charge of atomic power in their stellidyne cells. The rental of a robot from Malgarth's Corporation was less than the hire of a human worker. Consequently the Corporation prospered exceedingly.

Soon long red space-cruisers, bearing the black cog wheel that was the trademark of the Corporation, were carrying technomats through all the Galactic Empire. The agencies of Malgarth, with grim-lensed robots presiding over desks and counters, were set up on every inhabited planet; branch factories in every civilized system.

Any man, presently, from one spiral arm of the Galaxy to the opposite, could hire a quick, efficient technomat to perform any conceivable task—for less than the cost of human labor. And a

golden tide of currency and exchange flowed into the agencies of Malgarth, until the Corporation was richer than the Empire.

Civilization, for a time, rejoiced in the strength and efficiency of these super-machines. Bari Horn, the inventor, was widely honored as the supreme benefactor of mankind. The nameless laboratory assistant and the diamond block, meantime, had slipped from the sight of the world.

AND still the ancient, tarnished hull of the *Astronaut* held its path about the Sun. But that amazing perception, that inexplicably had showed me so much, began as inexplicably to fail. In the last ten thousand years, I had noted, men had begun to feel an alarmed and puzzled resentment against the gift of Malgarth's technomats. But, before I understood what was happening, all contact faded.

The stars were blotted out. The Sun was gone. I was no longer aware of the rusted metal about me, or even of my body. The universe was a void of darkness. I lived through eternities of lonely despair.

Was my mind, I wondered bleakly, joining my body in death?

But suddenly something flashed out in that eternal darkness. It was a glowing, prismatic oblong. It was the diamond that I had seen made in the laboratory of Bari Horn. And within it was the figure of Dondara Keradin!

Or Dona Carridan, my beloved wife!

It was the woman in the crystal box, who so long ago had commanded me to fly the *Astronaut*!

The shadow moved, within the crystal. A slim hand lifted in greeting. That white body was indeed the body that I had known and loved, those violet eyes were the same that twice had died.

"Barry Horn," said that shadow, softly, "or Bari—for what matters the

name, when it is you?—I must tell you that it is through my senses that you have perceived all these things while you slept."

"Dona, Dona," I was trying to sob, "is it you?—Or Dondara?"

"It is I," she said. "And I must warn you. For the senses that you, or Bari Horn, gave me in this crystal brain can dimly pierce the mists of time. I see black danger waiting, for you and me and all mankind—together. I see the final struggle, when you, side by side with the last Earthman, fight Malgarth. But the end—the victory—I cannot see.

"And now farewell—for you are about to wake!"

Shadow and shining crystal vanished.

There was only darkness. Wrapped in its choking shroud, I struggled back toward life. My body, that had been stiffly moveless for unmeasured ages, was suffused with prickling pains. The effect of Dr. Crosno's drug was passing, perhaps because of the age-long disintegration of the uranium salts it had contained. With a wrenching, agonizing effort, I moved one arm. Blind, stifled, cramped, I was suddenly fully awake, still in the flying coffin of the *Astronaut*!

IV

THE FALCON OF EARTH

MY dry lungs gasped for breath. For all the air, in the ages that I slept, had leaked out of the control room of the rocket. I struggled to reach the rusted oxygen valves.

Movement was sheer agony. Every joint of my body was painfully stiffened. My skin was hard, shrunken from age-long dessication. It felt brittle as time-dried leather. My eyes were

dim and blurred.

But I found the valve. It resisted. I struggled with it. Spots danced before my dulled eyes. My lungs screamed. But at last the precious oxygen hissed out, and I could breathe.

But the pressure was low, I discovered. Nearly all the vital gas had escaped, by diffusion through the solid metal. There was enough, perhaps, for a few hours.

Wolfish hunger came to me, and a parching thirst. But all the food aboard had gone to dust. The water tanks, through slow evaporation, were empty.

I rubbed a film of ancient dust from the ports, and found the Earth. Yes, it had to be the Earth—but how it was changed! The continents were larger, their familiar outlines altered; the seas had dwindled. What ages had I slept!

I knew that I must reach the aging planet before those few remaining pounds of oxygen were gone, or perish. I wound the chronometer—it was strange to hear its racing tick again, after those millennia of stillness. Gingerly, then, I tried the rocket-firing keys.

There was no response.

Stiffly, awkwardly, I climbed down among the tanks. Any movement, I felt, might tear my brittle skin like paper. I stumbled.

But I found the trouble. The fuel pumps were clogged and rusted with a dried gum, stuck. But there was good fuel remaining in the sealed tanks. I found a can of oil, got the pumps to working, and cleaned the sponge-platinum detonators.

Wearily, I clambered back, tried again. A moment of agonizing silence. Then a shattering explosion hurled the rocket sidewise. Only one tube had fired. But presently I got another started, and the third, and steered the *Astronaut* toward the Earth.

It was then that I first noticed a very

queer thing.

Against the black of space, beside the bright sunlit globe of the time-changed planet, I saw hundreds of little red stars. A crimson swarm, in regular lines and files, they swept about the Earth in a curiously, an ominously, purposeful order.

What could they be? My blurred, aching eyes, so far inferior to that perception that had come as I slept, could tell me nothing. But they saw something stranger still.

Something was wrong with the Earth itself! It had seemed very near me in the void, with its greenish, shrunken seas and its greater continents widely patched with the yellow-red of unfamiliar deserts—so near that I almost felt that I could reach out and take it in my hand, like a ball.

But suddenly it flickered.

An unaccountable haze, of red light and darkness, wrapped it briefly. Its surface shimmered queerly, as if seen through a veil of strange energy.

In a moment it was clear again, and I thought the trouble must have been in my throbbing eyes. But still I could see the ordered swarm of crimson stars. And I discovered that I would have to change the course of the rocket—as if the flight of Earth had been checked!

My numb hands touched the levers—and there was an abrupt, shattering explosion! The rocket began spinning giddily. I clung to the controls, and

shut off the remaining motors—for one had ceased to fire. In the silence I heard a deadly sound—the hiss of escaping gas.

One of the motors, clearly, had exploded—its metal crystallized, perhaps, by untold time. The remaining two would not hold the rocket to a straight course. And, final disaster, the shock had opened some seam. The remaining oxygen was leaking swiftly out.

THE agonies of asphyxiation were upon me again. I first thought it only some trick of tortured senses, when, faintly in the thinning air, I heard something clatter against the hull. I peered out, however—and saw a ship!

The tiniest midge compared to those mile-long interstellar cruisers of the Emperor and the Corporation that I had perceived as I slept, it was drifting close beside me. A graceful torpedo of silver, not eighty feet long, with a thick crystal needle projecting from a low turret amidships. Painted on its argent side was the green outline of a hawk, and, below a row of strange green symbols.

Strange? No! It was a queer experience. I looked at those symbols, and suddenly realized that they were letters, and that I knew how to read them! It was as if they had been in some language that I had learned long ago, and forgotten with all save the subconscious mind—and still I knew



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that language had not been invented when I left the Earth. They spelled an odd name: *Barihorn*.

Odd, I thought—and then knew it for a contracted form of my own name!

A thin line ran from a port in the strange ship's deck, just forward of the crystal needle. It was a magnetic anchor on its end, I realized, that had clanged against the rocket. Now a slender figure leapt out of the port.

A man, wearing silver-polished space armor that was close-fitting and graceful. Letting the line run through his gloves, he came flying through the airless void, across to the rocket. I saw his face, beyond the oval vision-panel of his helmet, looking at me curiously.

It might have been the face of some athlete of my own day. It was craggedly handsome, tanned and lean. It was stiff with wonderment. But a quick sympathy warmed the ice-gray eyes of the stranger. He seemed to understand my plight. A silver-clad arm beckoned me to unfasten the valve.

To open the rocket to the frozen emptiness of space! That seemed deadly folly. But death was already inside. My lungs were gasping in vain. My throbbing eyes felt as if bursting out of my head.

With stiff fingers I struggled with the screws that held the long-sealed valve. Billows of darkness rolled down upon me. An agony of fatigue slowed my efforts. But at last the plate slid aside and the last breath of air whispered out.

I collapsed across the rim of the port, fighting black oblivion. I knew that death, after that long, long race, at last had overtaken me. But suddenly something was being pushed down over my head. Fresh clean air was rushing into my face. I could breathe again!

My clearing eyes, through a crystal face-plate, saw what had happened. The silver-armored stranger was beside me—bareheaded! He had given me his

own helmet!

Blood was already starting from his breathless nostrils. But he caught my shoulders, dragged me through the valve, hauled us both up the line to the port of the silver ship. We tumbled into a little metal chamber, a valve slammed and I heard the hiss of air.

Leaning against the wall—for an artificial gravity field had gripped us again—the stranger closed his eyes and took several long breaths. The blue of suffocation faded from his rugged face. He grinned at me, and wiped the blood from his mouth.

"Well, stranger," he gasped, "you gave me a surprise! Your ship was listed in our charts as Comet AA 1497 X. We were observing it to correct our bearings, when it began to move!" A tone of awe dulled his whisper. "You must have been aboard a long time."

I clutched at a hand rail for support. A deadly fatigue was in me. My body was still a stiff dried husk of pain. I could see the amazed pity in the eyes of my rescuer, as he stared at my brittle, emaciated skin, at hair and beard and nails that had grown grotesquely long.

"I have been," I told him.

AND only then, when I had spoken, did I realize that I had learned another language as I slept—a tongue unknown when I had left the Earth. And I knew, with something deeper than memory, that my teacher had been the shadow in the crystal, the eternal mind of Dondara Keradin.

"I know your voyage has been a long one, stranger." Wonder was still in the voice of the stranger. "For all objects designated with an 'AA' have been charted a million years or longer."

"A million years!" I whispered. The world reeled. "What year is this?"

"This is the year 1,200,048 of the Conquest of Space," he told me. He ran long fingers through the thick yel-

low shock of his tangled hair, and stared at me strangely. "It is that long," he said softly, "since Barihorn left the Earth."

Barihorn! And that was the name of this space ship! I murmured the syllables.

"My name is Barry Horn."

The blue-gray eyes of the man in silver went wide. His rugged face lit suddenly with incredulous hope. His trembling fingers touched the cracked yellow skin of my hand, as if he doubted my reality.

"Barihorn!" he whispered. "Then the legend is fulfilled! I can hardly believe it. But I saw your ancient ship—so tiny and rusted that it had never been taken for a ship. I don't know how you lived—but the Dondara Stone had promised that you would." An eager enthusiasm was ringing in his voice. "I salute you, Barihorn!"

I was swaying with weakness and fatigue. Thirst and desperate hunger tortured me, and the agonizing stiffness of my body. But these riddles were more urgent still. The Dondara Stone—was that the crystal brain of Dondara Keradin?

I stared at the young giant in silver, and once more my dry throat found husky speech.

"Tell me—" I gasped. "There are so many things that I must know! But first tell me who you are, and how you know of the Dondara Stone, and if there is still"—some instinctive dread brought my voice to a whisper—"still a robot named Malgarth?"

A cold bright light flashed in the eyes of the stranger.

"My name," he said, "is Kel Aran. But to the Emperor's Galactic Guard, and to the Space Police of Malgarth's Corporation, I am just the Falcon. Or sometimes the Falcon of Earth—for I was born on your own planet, Barihorn!"

I was reeling on my feet. He reached out a strong argent arm to steady me.

"The Stone?" I whispered.

"The Stone is on the Earth." A reverence was in his voice, as if he had spoken of a living god—or goddess. "I saw it once when I was a child on Earth. For my father was a Warder of the Stone. And now—"

I wondered at the softness in his voice, the shadow of agony on his cragged face.

"Now," he said, "Verel Erin is the Stone's Custodian. She is a red-haired girl of Earth. I loved her when we were children in the desert valley where the Stone is hidden. I loved her—but the Warders chose her to be the Custodian."

His lean face was white, and his tone had the break of tragedy. Darkness was crowding upon me. But I found the strength for one more question.

"Malgarth—"

THE silver shoulders of Kel Aran drew square, and his gray eyes shone with a fighting glint.

"Malgarth still rules the Corporation," he said. "And the Corporation has grown mightier than the Empire. Your prophesied return is in good time, Barihorn, for the struggle is at hand! It will be the robots, or mankind—both cannot survive."

"War?" My dry lips moved without sound. "There will be war?"

"Men have been enslaved," rang the voice of Kel Aran. "Now they fight for freedom. We have cruised the Galaxy from Koridos to Tenephron, and everywhere there is rebellion—brave and yet hopeless rebellion against the iron might of the Space Police and the fleets of the Galactic Guard! For Malgarth moves the Emperor like a puppet, to the murder of his own wretched kind.

"We have come now to beg the aid of the Stone—for without the ancient

secret that you sealed within its crystal brain, Barihorn, there is hope of nothing save death. The Stone, I know, is slow to act—there was a legend that it would never strike until you returned, Barihorn. But we had hopes that it would move when we told of all the suffering we have seen—mankind enslaved and tortured and destroyed beneath the iron wheels of the Corporation!

"But we found a great fleet of the Galactic Guard blockading the Earth. Hanging here, waiting for a chance to slip through, we discovered you, Barihorn—incredible good fortune, if you can move the Stone to strike! But there was something more alarming—a haze of fire and darkness that wrapped the Earth."

Weakly fighting those mounting tides of blackness, I remembered the flying red stars I had seen, and the flicker of the Earth. I shared the puzzled apprehension in the voice of Kel Aran:

"We cannot understand—"

He was interrupted by a sharp metallic rapping on the inward valve. It clanged open, and I saw three anxious men in the corridor beyond. Three blurred figures, one dark and gigantic, one pale and corpulent, the third a mere brown wisp.

"Kel!" It was a chorus of terror. "The Earth—"

A last black billow overwhelmed me.

V

WORLD CONDEMNED

I WOKE on a narrow bunk aboard the *Barihorn*, and slept again at intervals. For a long time my mind was blurred with weakness. Yet I sensed the air of haste and desperate tension aboard the craft; I could hear the hard-driven whine of her machinery.

I knew that Kel Aran was battling to reach the Earth—and the Earth girl that he loved, Verel Erin, lovely Custodian of the Dondara Stone. And I knew that he was about to fail.

"A most desperate raid!" I remember the words of Zerek Oom, once when he brought me a bowl of thin hot soup. "There's all the Twelfth Sector Fleet of Admiral Gugon Kul, against us; and some fearful weapon of Malgarth's, attacking the Earth, that has not been seen before. If we win through, to reach Verel Erin and the Stone, it will be through your ancient power, Barihorn!"

Even the cook showed an awed faith in me, as a sort of supernatural deliverer. That gave me an uncomfortable hollow feeling. In incredible fact, I had lived somewhat more than a million years. But I failed to see how that would make me a very formidable champion of mankind, in the long-delayed rebellion against the iron tyranny of Malgarth.

My body seemed no more than a shrunken lump of thirst and ravening hunger. I must have drunk a good many gallons of water and wine and soup before I was able to leave the bunk. Once I glimpsed myself in the mirror of a tray. My skin was yellow and cadaverously drawn; my long-grown hair and beard had turned completely white. Very moderate changes, I suppose, considering my age. But the impact was startling.

Lean little Rogo Nug, the engineer, had rubbed my skin with a vile-smelling ointment that he cooked up in the galley. It burned savagely at first, but softened that brittle dryness. And big Jeron Roc forced me to take some bitter internal medicine.

In the confused intervals of half-awakening, I learned a little of the three companions of Kel Aran, and how they had come to join the Earthman's out-

law crusade against the Corporation. Each of them had suffered some grave injury from the robots.

For the ultimate object of Malgarth, they believed, was the total extirpation of mankind. On every planet the agencies of the far-flung Corporation had been growing more wealthy, at the expense of human owners. The robot legions of Malgarth's Space Police were gathering power. Everywhere it was becoming more and more difficult for a mere human being to own anything, to find a job, to feed himself and his dependents, or even to get into the relief lines to receive synthetic gruel.

"Why waste with human labor?" ran an old slogan of the Corporation. "Let a robot do your work—efficiently."

And now the very existence of mankind, said Jeron Roc, seemed a waste to Malgarth. The Corporation's loftily-named "technomitanization" campaign was in reality a cunning and ruthless effort to supplant mankind.

Jeron Roc, navigator of the *Barihorn*, was a native of Saturn. He was massively tall, dark-skinned, with the piercing eyes of intellectual power. He came of a proud and ancient family; his father had been the foremost astronomer of the solar system—until a new edict of the Emperor reserved scientific research for the robots alone.

"The will of Malgarth is now the law of the Empire," he explained. "For the Corporation owns nine tenths of the property in the Empire. Without the taxes paid by the robots, the Emperor and his bureaucrats would starve. Therefore the fleets of the Galactic Guard support the outrageous claims of the Corporation."

The proud old savant, anyhow, had refused to surrender his observatory. A mob of robots from the local agency stormed the building, smashed priceless instruments, and killed the old astronomer.

Returning from the great university on Titan—because another imperial edict had closed it to human students—Jeron Roc found the burned ruins of the observatory still smoking, and saw his father's body under the iron heel of a robot policeman.

THE disruptor gun had flamed of itself in his hand. The technomaton exploded with a blue flicker of hydrogen. Dazed by his audacity, Jeron fled—for he had destroyed Corporation property and resisted the Space Police, hence was twice liable to death—and at last escaped into space.

Of the two others, I had not learned so much. But Rogo Nug, who served the atom-converter generators and space-contraction drive of the *Barihorn*, was a veteran "space-rat." A brown little wisp of a man, thin lips purpled with the roots called *goona-roon* which he chewed incessantly, he cursed picturesquely if sometimes lewdly by the anatomical divisions of the Emperor and the mechanical parts of Malgarth. He could not recall the planet of his birth. But his father, a stevedore of space, had been executed for the crime of striking against the Corporation; his mother, cut off relief for "harboring traitorous sympathies," perished; and Rogo Nug had become an orphan waif of the spaceways.

The cook, Zerek Oom, was inordinately fat, totally bald, and extremely white—being a native of one of the cloud-veiled worlds of Canopus. He was decorated with the most brilliant and remarkable tattooing I had ever seen. He had inherited vast estates, but the "technomitanization" laws had forced him to discharge his human laborers to starve, and rent robots in their stead; then, when a hungry world had no money to buy his crops, he went bankrupt, and the Corporation took his lands in lieu of robot-hire. His chief regret

appeared to be loss of the wine cellars beneath his old mansion.

Kel Aran himself, commander of the *Barihorn* and operator of the crystal-needled barytron gun, was more than a mere pirate of space. True, he had many times raided ships and agencies of the Corporation. True, vast rewards had been offered "for the body, dead or living, of that outlaw Earthman called the Falcon."

Pausing once beside my bunk, while Jeron Roc was at the controls, he told me a little more of himself. A lean, straight athletic figure, tense now with the urgency of this battle to reach the Earth. An ice-blue light glinted in his eyes.

"We must reach the Earth and the Stone, Barihorn," he whispered. "That seems the only hope to break the iron dominion of Malgarth—the secret that you sealed into the Stone a million years ago. That is," he looked at me hopefully, "if you cannot recall it."

And I could not recall it—for the maker of Malgarth, one with me in the legend, had been separated in reality by a hundred thousand years of scientific progress.

"Twelve years have gone, as Earth measures time," he told me, "since Verel Erin was chosen to be Custodian of the Stone. My boyhood had been happy enough, in that secret desert valley where the Stone is kept, because I loved her. When she told me, sobbing, I did not try to dissuade her; for that is a duty of honor—no human being could ask a higher task than to guard the Stone. Yet I knew that I could not endure to live on Earth, never tasting her kisses again, or feeling her bright-haired beauty in my arms. I told her farewell, on the night before she received the Stone and went out of the valley.

"In the mines and the plantations of the Earth I saw the hard lot of man-

kind, beneath the robots. All save the meanest work was forbidden me, reserved for the technomats. And the pay barely kept me alive. I saw that all the Earth, save only our hidden valley, was lost to the iron talons of Malgarth.

"I joined the Galactic Guard, hoping for a chance to fight for the rights of men. But I found that the Emperor was but a tool of Malgarth. On one planet we were ordered to bomb a band of men whose crime was that they had risen against slavery, and left the fields of the Corporation, and gone to make homes for themselves in the barren hills.

"Therefore I deserted from the Galactic Guard." A malicious grin lit the face of the Earthman, and he pushed back this thick yellow hair. "I took the private space launch of the Admiral, Gugon Kul. It was a swift, space-worthy craft. It outran all his fleet. It is now the *Barihorn*!

"Everywhere I have found men discontent with slavery, stirring under the iron heel of Malgarth. I have sought to aid them. Our raids have been for money and food and arms, to aid the rebellion.

"Chance has given me three kindred companions. Jeron, the scholar, the strategist of revolt—I took him from a cathode squad of the Space Police. Rogo Nug, the spy—he has been through the private papers of Gugon Kul, on his own flagship! He came abroad the *Barihorn* to steal our instruments, and stayed when he found that we were also against the robots. Zerek Oom I found in a concentration camp, subsisting on half a cup of synthetic slop every other day. Sober, he is silent enough. But make him half drunk, and his oratory could lift the dust of the dead to fight Malgarth!"

Kel Aran shook his yellow head.

"Three loyal companions." His voice

was weary. "Jeron has made a hundred plans. Zerek Oom has fanned revolt on a hundred planets. I have led a hundred raids. But we are beaten everywhere. We can't fight the Corporation and the Empire, too—not unless the Stone will aid us.

"Your return, Barihorn, is our first good fortune—"

SUDDEN interruption. Rogo Nug burst in upon us, trembling, his dark scarred face oddly ashen.

"Kel!" he gasped. "Come to the bridge—Jeron wants you! It is the Earth—that haze again! Still we cannot pass the fleet—by the brazen beak of Malgarth, there was never such a blockade! And the Earth, Kel—it is dropping into the Sun!"

"I must leave you, Barihorn!" And Kel Aran rushed forward.

Still unable to leave the bunk, I knew from muttered words and tense white faces and the racing drone of the engines that we were making a desperate attempt to run the blockade, darting up through the Earth's cone of shadow.

And I knew when we were halted by the fleet. The generators stopped. And Zerek Oom, slipping forward, whispered that the commander of a Galactic Guard cruiser had challenged us on the telescreen communicator. Faintly, down the silenced corridor, I heard the voice of Kel Aran:

"But, Commander, we are only a gang of space-rats. We've been mining the drift off beyond Pluto. Our supplies are gone, all but a few tins of syntholac, and a few mouldy space biscuits." His tone had an assumed whining ring. "We're only putting in to this planet, sir, to trade our metal for food and grog and a breath of fresh air."

Then a gruff voice thumped from the communicator:

"Drift miners? Your ship is very

trim and swift for a space-rat's crate? And why were you running up the shadow?—I'd hold you on suspicion, if there weren't bigger business afoot."

I caught the hard swift voice of Kel Aran, rapping aside into the ship's phones: "Rogo! Hold the generators ready!" The deep voice boomed on from the telescreen:

"But you won't get your grog on this planet! For it is quarantined and condemned, by edict of the Emperor. All intercourse and communication is prohibited, until the planet has been destroyed."

"Destroyed?" The voice of Kel Aran held desperate alarm. "The Earth destroyed!" Then he remembered the space-rat's servile whine. "For what cause, sir?"

The official voice thumped again:

"There is rumor of a secret weapon on the Earth, kept hidden against Malgarth since the Master Robot was made by the scientist Barihorn. There is no truth to it, of course—a million years have proved that Malgarth is truly invulnerable. But the rumor is spread by this renegade Earthman, the Falcon, to incite rebellion.

"To end the rumor, therefore, to punish the Falcon, and to remove any possibility that the rebels have a secret base upon the Earth—for those three reasons, the Emperor has decreed the destruction of the planet. You'll get no grog on the Earth!

"And more, space-rats—if your little tub is caught within ray-range of the fleet again, you'll be burned on suspicion of piracy, sedition, and rebellion!"

The communicator thumped and became silent.

I fought the drowsy weakness that had followed my long, long sleep. I tried to follow the last desperate attempt of Kel Aran to reach the doomed Earth. Through strained, hasty words

and the sounds that came to my bunk, I traced the outline of events.

He retreated, in seeming obedience to the space commander. He landed the *Barihorn* upon a tiny asteroid whose orbit would take us to sunward of the Earth; clung hidden in a fissure of stone, waiting to be carried through the space fleet.

But the Earth was wrapped again in that puzzling haze—and snatched toward the Sun!

Reckless of the guarding fleet, Kel Aran left the asteroid, which was suddenly far behind, and raced after the Earth. From one of the red guarding stars stabbed a narrow lance of blue—a barytron beam whose finger of destruction reached out a million miles.

SIDE by side at the controls, Kel Aran and Jeron Roc fought desperately to avoid it. We escaped the core of the ray. But its edge touched the *Barihorn*. A hammer of fiery doom!

The impact of terrific energies hurled us backward. The whole ship flamed with blue electric flame; the air stung with ozone. And the whining of our engines ceased.

"Power!" I heard the pleading voice of Kel Aran. "We've got to have power—the Earth is almost to the Sun!"

"By the livid liver of the Emperor," came the plaintive voice of Rogo Nug from somewhere aft, "the overload burned out the converter circuit. There is no power!"

"The Earth!" There was stark, hopeless horror in the voice of Kel Aran. "What can we do?"

I dragged myself out of the bunk and tottered toward to the compact pilot-room in the nose of the *Barihorn*. With black, impassive eyes, the big Saturnian was staring through a port. Husky-voiced, stricken, the Earthman was gasping into the ship's phone, begging Rogo Nug for power.

Clutching a rail, beside Jeron Roc, I looked out upon that dreadful tableau in space. The Sun filled a vast flaming circle. Softened by filter-screens, it still was blinding. Against its intolerable face I could see the small dark disk of the Earth, still blurred with that haze of sinister force; and, cruising about it, the tiny red stars of the fleet.

The Earth was dwindling swiftly.

"What awful power!" whispered the tall Saturnian. "They're driving it like a ship—straight into the Sun!"

Kel Aran was beside us. His hard fingers were on my arm, unconsciously contracting until I thought the bone would snap. For the red stars drew suddenly away from the diminishing planet. For an instant, as the haze vanished, it was a sharp black dot against that ocean of merciless white. And then it struck.

A tiny pock of darkness spread on the face of the Sun. It closed again, and in its place was a hotter whiteness. A tongue of white flame lifted and dissolved—oddly like the splash where a raindrop has fallen.

And I knew that the planet Earth, after all its varied millions of years, had come to an end.

"Verel!" It was a dry choked sob from Kel Aran. "Verel, we have failed!"

PART TWO

VI

COSMIC STORM

BE it proclaimed to all technomations and men, in the name of Tedron Du, Emperor of the Galaxy, by Gugon Kul, Admiral of the Twelfth Sector Fleet of the Galactic Guard:

That all human natives of the planet

Earth who escaped the recent destruction of that planet in accordance with the decree of the Emperor, their very escape being overt treason, shall be seized wherever found and dealt to death in the manner reserved for traitors against the Empire of technomations and men and the person of the Lord of the Stars.

That ominous proclamation had been printed on the recordstrip of the telescreen. Rogo Nug had just completed repair of the burned-out circuits; and big Zerek Oom had suggested, a little apprehensively, that we had better leave the solar system.

"Both you and Barihorn are native Earthmen," he argued. "That is obvious to anyone familiar with the evolutionary adaptations of the natives of the different planets. If we should happen to be seized by old Gugin Kul—"

His big white hands made an unpleasant gesture.

But Kel Aran shook his yellow head. His gray eyes were cold and clear as polar ice, and there was something startling in their impact.

"No," he said flatly. "The very proclamation suggests that some refugees escaped the doomed planet. We're going to search. Until we find Verel and the Stone." Grief and dread shadowed his eyes. "Or until we find that she is dead and the Stone destroyed."

He went out with Jeron Roc, in the vacuum armor, to paint the hull of the *Barihorn* with a dead-black stuff that reflected no light, hence made the little craft all but invisible in the dark gulf of space—unless it chanced to be seen against some luminous body.

Then, hanging cautiously in the bleak abyss, avoiding the fleet of Gugin Kul, we began the weary search. The Moon had been flung away upon an independent orbit, when that incredible force checked the Earth. And there were new mountainous masses flying in the

void that must have been torn from the planet itself.

With *telethron*-beam equipment coupled to the telescreen, we scanned the Moon and those hurtling fragments. In the rocky wilderness outside the domed cities of the Moon we found a dozen ships that had crossed before the planets had been torn apart.

But two great cruisers were already hanging beside the Moon. And swift patrol boats, looking like tiny gray comets with crimson tails, were darting down upon the refugees. Some tried to hide amid the rocks, or to defend themselves. But they were helpless against the blue, dazzling needles of the barytron rays, whose touch could explode a whole mountain into a frightful inferno.

Kel Aran boiled to witness such slaughter. He stalked up and down the narrow central corridor of the *Barihorn*, lean jaw white, fists clenched.

"Verel!" he kept muttering. "We must save ourselves, for Verel and the Stone!"

We cruised on to follow the fragments of the Earth. A few survivors clung to them, in the sealed hulls of aircraft, or in improvised breathing masks. But none that we saw bore any likeness to Verel Erin. And scores of quick little patrol boats were already hunting them down, turning flaming rays on every twisted scrap of wreckage that had escaped the greater cataclysm.

KEL ARAN, as we searched, talked a little of the girl. His voice was dry and husky. He would speak of their childhood together, and then come back with a jerk to realization of the present tragedy.

"We were strong children," he said. "We worked. For there were no robots in that hidden valley. Only the simplest machines. I worked with a hoe in the narrow fields below the spring. And

Verel went every day to herd the goats in the dry uplands. Sometimes, when my work was done, I would go with her.—And now she may be dead!”

He bit his lip, and it was a little while before he spoke again.

“Verel was a brave girl,” he said. “She was lithe and tanned. She had impish greenish eyes, and bright red hair. I remember one day when we left the goats, and climbed high up among the rocks toward an eagle’s nest.

“She was lighter and swifter than I, and better at climbing. She was afraid neither of falling nor of the attacks of the screaming birds. She climbed far ahead of me, and reached the nest, and sat laughing at me until I reached her. I wanted to throw the young birds out, for there were the bones of a kid beside the nest. But she pitied their helplessness, and made me leave them.

“It was that day that I first kissed her, and we pledged each other all our love. We would find another unknown valley, we promised, and forget the Stone and the robots and all the trials of mankind. But it was not two years before she was chosen—because all the Warders knew her courage and her strength and her faith—to be the Custodian.

“If only the Stone had struck at Malgarth when she first received it! For she promised she would beg it to—”

His voice choked off, and he swayed wearily down the corridor again.

Jeron Roc and Rogo Nug and Zerek Oom tired of our perilous quest. My own hope was gone, and I begged Kel Aran to abandon it.

“We’ve seen the fleet search all the solar system,” I told him. “There can’t have been many survivors, and the rays have already burned all we have seen. There can’t be any use—”

“Even now,” insisted Kel Aran, “she may live.”

This lean young fighting man—the

last son, perhaps, of the murdered Earth—made some precise adjustment to the controls of the searching telethron-beam. An impatient sweep of his head flung back long yellow hair. His eyes smouldered with a stubborn light.

“Verel,” he insisted, “may be still alive. She may be clinging to some fragment that was hurled beyond the range of the search. She may have been picked up by some passing freighter that carried her to safety.

“No, we must search—so long as we can!”

The Telescreen shimmered and cleared again, and upon it I saw a colossal gray cruiser, driving straight upon us. Her armored nose, bristling with the gleaming crystal needles of barytron projectors, filled half the screen. The flaming atomic exhaust of her repulsors, behind, made a wide crimson halo against the dark of space.

Kel Aran caught a quick little breath of alarm, and spun the dials.

The screen flickered again, and then showed a dark, massive, bearded face. Its lips were thickly sensual, cruel. Its eyes seemed stupid, and they glinted with yellow malice.

“The Admiral,” whispered Kel Aran. “Gugon Kull! He must be giving some command. We’ll listen.”

He touched some control, and a guttural, triumphant voice boomed from the screen. The first word, oddly, had the familiar ring of my own name:

“—*Barihorn!* The ship is coated with some light-absorbing pigment, but our magnetectors have picked it up. Pirate and Earthman, the Falcon is twice our prey. The *Barihorn* must be surrounded!”

A HARD bright smile had set the face of Kel Aran. The gray eyes narrowed, until he looked almost hawk-like in reality.

“So, they’re after us!”

The telescreen shimmered again, and showed a wide black rectangle of space. The Sun was a sharp white disk, and the stars were an unfamiliar pattern—nearly all the constellations I had known had dissolved in a million years of change. And there was a little cluster of crimson points that crept among the rest.

"Half the Twelfth Sector Fleet," muttered Kel Aran. "Six hundred cruisers—after us!"

He called Jeron Roc from his bunk. They held a swift consultation. Technical terms were confusing to me. But I understood that the space-contraction drive of the *Barihorn* gave our craft the advantage in maneuverability; and that the newer cosmical repulsion drive of the Admiral's cruisers, while it left them a little clumsier about getting under way, gave them by far the greater ultimate speed.

"We can keep ahead for a time," the Saturnian admitted apprehensively. "But in the end they can run us down. And every cruiser carries a hundred patrol boats that is our equal in fighting power.—It was simply a mistake to stay and search so long."

"No," the Earthman insisted stubbornly. "We must find Verel Eriñ."

He consulted the charts—reels of transparent film viewed through a stereoscopic magnifier which gave a three-dimensional image of the array of worlds in space. He rapped swift commands into the ship's phones. The hull drummed to the swift rhythm of the engines. The Sun diminished to a yellow point behind, and was lost and greater luminaries. But the red stars of the fleet grew brighter, and they spread ever wider across the black of space.

Jeron stood like a grim dark statue over the controls.

"Kel," he called, in a deep grave voice, "there's an area of cosmic storm

ahead. They're spreading out, trying to hem us against that. I think we had better double back—there's one chance in a million—"

"No," said Kel Aran. "Follow the course I gave you."

On the telescreen, the navigator showed me the storm. Against the familiar panorama of space; the velvety blackness, the hard changeless many-hued atoms of stars, the nebulous dust of silver—against that stark eternal beauty sprawled an ugly cloud. It was many-armed, like an octopus of darkness, and it flickered with a weird angry green.

"There it is," said the Saturnian. "A condensation of matter so tenuous and vast that its gravitational energies never gathered it into a star. A true cosmic storm!" Awe deepened his voice. "Tempests of incandescent gas. Rain of molten metal. Hail of meteoric fragments. Lightning of atomic energy.—And Kel commands me to drive straight into it!"

The crimson stars behind were brighter, now. Lines of them spread out, to right and to left, above and below—as if to herd us into the storm. And among them flashed points of ominous blue.

The blue points were barytron beams, I knew. Jets of barytron particles—the mysterious heavy "X-particles" of the physics of my own day—they could reach out to smash the very atoms in a target a million miles away.

Seeking to vary the strained anxiety of that race for life, I went back into engine room. Hunched gnome-like amid the strange shining bulks of his machines, Rogo Nug was chewing steadily on a wad of his *goona-roon*. He spat into a purple-stained can, and plaintively observed:

"Look at that! By Malgarth's brazen bowels, Kel is making me burn the very life out of the converters!"

He pointed to a crystal tube, with drops of water falling swiftly down it.—Water was the fuel of the *Barihorn*. Hydrogen atoms in the converter, were built into helium, with the “packing fraction” liberated as pure energy to activate the space-contractors. The freed oxygen renewed the atmosphere aboard.

A RED light was flashing, beside it, a gong clanged at monotonous intervals.

“The warning,” muttered Rogo Nug. “Overload!”

Tension of dread drew me back to the pilot-room. That appalling cloud of green-flickering darkness had grown against the diamond field ahead. Its spiral arms reached out as if to grasp us. I tried to comprehend its vastness: a hundred light years meant six hundred trillion miles.

The pursuing cruisers drew inexorably closer. The formation changed again, so that they formed a double circle of crimson flecks, brighter than the stars. The flashes of blue came faster. Abruptly, beside us, flamed out a blue-white sun. I shrank and blinked from its burst of blistering radiation.

“A stray meteor from the cloud, that a beam caught,” commented the impassive dark Saturnian. “It might as well have been the ship.”

His face a grim-set mask, Kel Aran came down from the little ray-gun turret of the *Barihorn*.

“The range of their beams is about nine times ours,” he said softly. “Means about eighty times the power.” He went to the telescreen. “Wonder what our friend the Admiral has to say by now!”

That stolidly dark, craftily stupid face flashed on the screen again, and the great guttural voice thumped from the cabinet:

“—must not escape, for he is the last

surviving Earthman. I have just received a communication that should increase your interest in the chase. The Corporation offers all the revenues of the twelve worlds of Lekhan, to be divided among those responsible for the capture or death of the Falcon. And the Emperor has commanded that, if the Falcon escapes, those held responsible shall die.”

A sudden reckless grin lit the face of Kel Aran. His bright eyes narrowed, and a quick hand swept back his thick yellow hair. And then, while Jeron Roc made a frantic, futile snatch to halt him, he twisted a knob. In a light, taunting voice, he called:

“Greetings, Admiral!”

The dark, thick-featured face stared at him, first in stiff stupefaction, then crimsoned with a seething rage.

“You—Earth-rat!” he choked. “You dare—” He gulped, caught his breath. “Tapping my communicator will be your last bit of insolence,” he bellowed. “We’re taking you, Falcon—for Malgarth!”

Still with that bright smile frozen on his lips, Kel Aran made a little mocking bow.

“The robot’s offer is flattering, Admiral.” His soft low voice had the lilt of a song. “But I’m going to let him keep his star. And I hope the Emperor doesn’t hold you responsible for letting us slip through your fingers!”

Gugon Kul stood gasping, turning swiftly purple.

“Now, Admiral,” said Kel Aran, “I’m going to sing you a song. I call it the *Ballad of the Last Earthman*.”

And he began singing into the Admiral’s startled face. His voice was clear and gay, and the tune had a swing that quickened the heart. The words told of his boyhood on the Earth, and his love for the Earth-girl, Verel Erin; of the murder of the Earth, and his long search for his beloved; of his determin-

ation to continue the stellar quest,

"Till I find her or I die!"

The dark-flushed Admiral listened for a little while. Then he began shouting orders for the fleet to close in. He thought of something; his big hairy hand moved quickly; and the screen became a giddy blur.

The stellar cloud now was close ahead. A faint green light pervaded it—the eerie green of mysterious *nebulium*, it was just strong enough to outline jagged plunging masses of stone spinning in inconceivable vortices. Brief explosive crimson flickerings, beyond, suggested the appalling vastness and power of the cloud.

THE Admiral's cruisers were closing in behind, a double ring of scarlet flares. Blue flickered among them. And white stars burst out in a blinding swarm about us—meteoric fragments exploded by the rays.

The big dark Saturnian looked gravely from his instruments to Kel.

"Still, Kel," he said, "there's the shadow of a chance—if we turn back among them!"

Kel Aran shook his yellow head, and his lips parted with a smile that welcomed danger.

"No," he said again. "I'm taking over now." And his bright, reckless face turned to me. "Now, Barihorn!" he whispered, "If your life is eternal—"

Then the dark sky behind and the pursuing crimson stars were blotted out. We were within the cloud!

hurricanes of greenly incandescent gas, and tugged and battered at the ship. Death bathed us in rains of molten metal, and knocked upon the hull with a hail of meteoric fragments.

And Kel Aran met death, and mocked it, with the same lilting song that he had sung the Admiral. He had taken the big Saturnian's place at the controls. His lean hands moved with a quickness I had never seen. And the twisting, spinning ship seemed to respond to the life and the rhythm of his song.

As for my own life, I could not feel it at all eternal. The freaks of chance might have kept me alive a million years—but no chance, I felt, could pick a safe path through this insane chaos.

"I think," the Earthman interrupted his song, "that the Admiral will not care to follow us here—not even for Malgarth's star!"

Jeron Roc stood rigidly by, clinging to a hand rail against the wild lurching of the ship. I saw Zerek Oom, the fat, tattooed cook, standing startled and petrified at the end of the corridor. I saw him again, after Kel Aran had earned another trick from death, and now all his tattooing had a background of sickly green. I looked again, and he was swaying aft at an unsteady run, toward the lavatory.

Some iron fragment must have struck the hull, despite all the well-tryed skill of Kel Aran, for it rang like a great bell and the little ship began to spin end over end. I clung with both sweating hands to the rail, and felt as ill as Zerek Oom.

When the ship was steadier again, I tried to go back to my bunk, and stumbled headlong in the corridor. Jeron came to help me, and then made me take another dose of his bitter, nauseating medicine.

"I've lived a million years," I gasped, "without you to doctor m—"

The walls about me rang to another

VII

CIRCUS OF SPACE

THE lurid glow of death was shining all around us. Death rode down upon us on gigantic ragged boulders. Death shrieked at us from

fearful crash, and the ship began to spin again. A blistering heat was creeping through the insulated hull. The air was stifling. I felt the faint, deadly sting of some penetrating radiation. And then a great hand of darkness extinguished all my spinning, tortured world.

The next I knew, the *Barihorn* was humming smoothly again through the dark vault of stars. The coiling nightmare cloud was already lost behind. We had emerged from one of its spiral arms, Kel Aran informed me, at right angles from the direction of our entrance.

"Old Gugon Kul tried to patrol all the borders of the cloud. But that would have spread a hundred fleets too wide. Anyhow, he wasn't looking for us to come out alive."

"So he thinks we're dead?" Relieved, I sat up on the bunk. "He won't be hunting us any more?"

But big Zerek Oom came waddling out of his galley, wiping his fat tattooed hands on a white apron, to rid me of that comforting illusion.

"Worse luck, Barihorn," he sighed, with a sad look at Kel Aran, "Indeed the Admiral believed us lost. He called the offices of the Corporation—we picked up the message on the telescreen—and reported that we had perished in the cloud. And the reply was relayed from black Mystoon—from the unknown lair of Malgarth himself—that the reward of a stellar system would be duly paid for the death of the Falcon."

"Well?" I said. "What's wrong with that?"

THE round pale eyes of Zerek Oom looked reproachfully at the Earthman.

"Kel tapped his communicator again," he told me. "Boasted that we had got away. And that you, Barihorn, the man who made Malgarth a

million years ago, were with him. And sang that song of the last Earthman again, until the Admiral was blue in the face!"

I looked at Kel Aran.

"The Admiral must have been furious, about the reward," I said. "He'll hunt us harder than ever."

That old reckless grin lit the Earthman's face.

"He was," he whispered happily. "And he will." Then his gray eyes became very sober. "I was sorry to do it, Barihorn. For it put us back in danger. And makes the quest for Verel and the Stone more difficult."

His yellow head shook gravely.

"But I could not let men believe that we were dead—for we are their only champions against the robots. And I wanted more of them to know of your miraculous return, Barihorn. We must keep hope alive, at whatever cost. Or men will yield to slavery and death, and our cause will be lost."

"I see," I told him. "And now what?"

His jaw set grimly.

"Still," he said, "we must search for Verel and the Stone. Malgarth fears you and the Stone, Barihorn—else he would be less anxious for our death. And we know that all the rebellion of mankind will be crushed, as surely as steel is stronger than flesh—unless we have the aid of the Stone."

"But how can we continue the search," I demanded somewhat apprehensively, "—now?"

Kel Aran grinned.

"We have a plan," he told me.

And the *Barihorn*, I discovered had been rechristened the *Chimerian Bird*. Rogo Nug was already painting on the new name along with certain gaudy advertising legends and enough spots of rust to make the hull appear as if it had been in service almost as long as my old *Astronaut*. Jeron Roc showed me a luridly lettered poster:

SEE! Naralek's SEE!
 Supreme! Colossal! Unrivaled!
 INTERSTELLAR SHOWS
 SEE
 The Weird Mermaid of Procyon II
 THE LIQUID MAN OF MOG!
 The Man-Eating Flowers of Koron
 And SETSI the SANDBAT
 ONLY EXISTING SILICIC BEING!
 Her Food is Flint!
 SHE READS YOUR MIND!
 and
 1,000,000 Wonders! 1,000,000

Most of the exhibits, I suspected, were pretty bald frauds—but that was in an excellent tradition that another Earthman named Barnum had established well over a million years before. The cunning handiwork of Rogo Nug was evident in the pickled mermaid, which looked remarkably like certain creations that I had seen of fish-tails and seaweed and coconut husk. I doubted that the flower, a stunted, rubbery-looking bush, had actually caught many men. The "liquid man of Mog" looked weird enough—a trembling mass of luminescent purple jelly; but I had seen Jeron Roc busy in the galley, shaping it out of chemical precipitates, a few wires, and a pocket torch.

In their years of stellar roving, however, the four had collected a good many genuine oddities. Setsi, the "sandbat," was one of these—and perhaps the most remarkable being I had ever seen. Her bodily chemistry was in fact based upon silicon instead of carbon; she really ate quartz.

In shape, she was something like a six-pointed starfish, some eight or nine inches across. Her flat body had a gorgeous crystalline glitter of a thousand yellows, purples, reds, and greens. In the center, where the six slender arms joined, was a single huge eye, dark and sorrowful.

"Once," Kel Aran told me, "after a

raid on a particularly rich agency of the Corporation, when Malgarth's iron police and the Galactic Guard were both hot on the trail, I was hiding out in a cavern on a cold dead planet that was lost from whatever sun once had warmed it.

"A regularity struck me, in the passages of the cave. I found fallen stones that once had been squared. And suddenly I knew that I was in the corridors of a colossal building whose upper stories must have crumbled down before the Earth was born. Groping about in the darkness, I saw a feeble gleam, and found—Setsi!"

I watched him dig the silicic being out of his locker. She looked frail and brittle as something blown out of bright-colored glass. I touched it, wonderingly, and pricked my finger on one of the needle-tipped arms.

"But it isn't—" I protested, "alive!"

"She is," Kel Aran assured me. "She's older than the Earth was. The silicic beings didn't reproduce. Only three of them appeared, when life was born on their planet. But they were immortal—practically.

"The three of them lived together, for billions of years. They dominated the far more numerous carbon-life, and came to rule the planet. But then there was some kind of triangular quarrel. I don't know the details—Setsi never mentions it, unless she is very drunk. But there was jealousy. One killed another. And Setsi killed the survivor, out of revenge. And she has been alone for a long, long time."

"Drunk?" I stared at the lean Earthman and the thing like a glass toy in his hand. Kel Aran nodded.

"Yes, Setsi shares a weakness of Zerek Oom. Her metabolism is stimulated vastly, but rather erratically, by the assimilation of any carbon compound. Gasoline would do, or sugar, but her favorite is alcohol—Watch!"

HE laid the bright rigid form on a table in the galley, and poured a few drops of rum into the palm of his hand, from Zerek Oom's hoarded bottle.

"Setsi, old girl!" he called. "Want your grog?"

A brighter lustre lit the great dark eye. I saw a quick vibration of a thin transparent membrane that stretched between the crystalline arms. And a whirring voice answered him, softly melodious as the cooing of a dove:

"Oh, she does, Kel! Setsi dies for grog!"

He stretched out his hand, and the brilliant thing came to surprising life. The fluttering membranes extended. The creature leaped into the air. A dancing shimmer of color, it flew to Kel Aran, alighted on his hand, and sucked greedily at the rum with a mouth on its under side.

The few drops of alcohol affected it remarkably. It flew from Kel's hand to the bottle, and clung there. Gently, the Earthman pulled the flask away.

"Setsi," he reproved, "you mustn't rob poor Zerek." And he told me, "She's one being who could make good on the old boast about drinking the contents and then eating the bottle."

The bright entity fluttered to me, and clung with hard light little claws to my arm. The Cyclopean eye looked solemnly up into my face.

"So you are Barihorn?" The whirring voice brought me the first disconcerting revelation of that uncanny intuition. "We are very old together, you and I and the robot—but you fear that you are not Barihorn, but only Barry Horn!" There was a queer liquid sound, oddly mirthlike. "Don't you worry, Barry. Setsi'll never tell!"

Unsteadily, then, she flew back to Kel Aran.

"Poor Kel!" she whirled. "He fears that Verel's dead. That Verel's dead,

and we'll never find the Stone. That Verel's dead, and he's the last Earthman, all alone. That Verel's dead, and he has only Setsi to console him."

There was a melodious sob.

"And poor old Setsi! She's the last sandbat. She has nothing but her age and her memories. Her age is a prison and her memories bitterest poison. Now she's all alone, for she killed the one who loved her. —Please give her just one more drop of rum, Kel, so she can forget. Just one more drop. Please, oh, please!"

Kel Aran clutched her shimmering body in his hand.

"Hold on," he muttered, "you old reprobate. We've got a job to do, Setsi. You've got to help us find Verel Erin."

"Oh, Setsi'll help you find her," throbbed the melodious reply. "Setsi'll surely find her. But you must be free with the rum, Kel. Setsi can't live without rum."

"Took you a cosmic time to find that out." Turning from his stove, big Zerek Oom rather anxiously snatched the bottle and locked it in a cabinet. "But neither can I."

The plan went ahead. Kel Aran became Naralek, the limping old showman from Alula Australis IX. His leathern space togs were bright with the shells and the plumes of foreign planets. He walked with a shuffling swagger, and blustered in the jargon of space. He chewed the *goona-roon* until it stained his lips and his unkempt yellow beard, and spat the purple juice with a reckless dexterity.

The little *Chimerian Bird*—her yellowed papers skillfully forged by Jeron Roc from a set Rogo Nug had stolen from a freighter—carried us from planet to planet. We always landed near some great city, and pitched a ragged tent. The voice of Zerek Oom, oiled with a little rum, could always

draw a crowd of curious countrymen to see the wonders of space.

Rogo Nug, the wizened little spacer, went about among the throngs, or sometimes slipped away on mysterious errands into city or barracks or space port. Usually he returned with valuable information about the plans of the Corporation and the Empire to crush mankind's rebellion. And often the pockets of his battered harness were stuffed with money and jewels.

CAREFULLY unwashed, draped in a bit of spotted fur and armed with a crude stone axe, I was billed as "the ferocious last caveman, the Atavar of Mars." My part, as I sat glowering and jangling my chain, was to listen for any chance mention of Mars' murdered sister, Earth.

Jerol Roc listened, as he sold the tickets. Kel did, as he limped about to display the mermaid of Procyon and the liquid man and the anthropophagous flower and the Atavar.

Then Kel, in a cracked, aged voice, would sing his ballads of space. He would crack jokes—some of them, to my weary knowledge, old a million years ago. And at last, with Setsi spinning about his head like a colored flame, he would break into a dance routine.

After the show, then, while we were loading the other exhibits and striking the tent, Setsi read the minds of all who would pay to enter Kel's little booth. And no thought of Earth escaped her.

In this way we searched planet after planet for any survivors of the mother world. And we found trace, indeed, of a few, perhaps a score in all, who had escaped when that strange agency of Malgarth's flung the Earth into the Sun. Eagerly, patiently, we followed down each clue. And always we found that the robot police and the Galactic Guard had been before us. The sur-

vivor, in every case, had been tracked down—and had died as a traitor.

But none of the dead was certainly Verel Erin. In that lay the thin and thinning thread of hope.

That was a weary, bitter time. Those planets where actual revolt had flamed out were closed by quarantine. Not even our unsuspected circus ship could pass the fleets of the Galactic Guard. But, even on the happier planets we were allowed to visit, the lot of man was cruelly hard. The robots, everywhere, had seized all possible advantage. Men were being ruthlessly pressed into unemployment, starvation—annihilation.

"Malgarth is cunning," said Kel Aran. "He begins slowly. He makes a test, to see if the Stone is still a threat. He tries to destroy all who might know of it—all Earthmen. Then he drives men to revolt, one planet at a time, here and there—and crushes them. He dupes the Emperor, and sends the Galactic Guard to put down the rebels. He would set man against man—until only two are left!"

And I knew that his hope was ebbing. Despair bit weary lines into his lean face, until there was need of little make-up to turn him into old Naralek. An increasing bitterness shadowed his eyes.

"There's an old proverb," he said, "about the futility of searching for a needle in a planet of pins. But that is easier than finding one fugitive lost in a hostile universe."

"Who is probably," put in the grave Saturnian, "already dead."

After a long circuit of the stars, we had returned, under the very eyes of Admiral Gugon Kul, to the system of the Sun. A bitter civil war was raging on the four great moons of Jupiter, the unemployed miners there having attacked the robots when relief was cut off. We were unable to penetrate the quarantine. And Mercury was now un-

inhabited by men, every human being having been slaughtered when the rebellion there was crushed. We landed upon each of the remaining planets, however. We crossed the trails of a dozen fugitives from Earth—and found that each trail had already ended in death.

Hope came, at last, when it had been abandoned.

The base of the Twelfth Sector Fleet in the solar system had been established on Oberon, outermost moon of Uranus. "Naralek" got permission to land and pitch his ragged little tent beside the vast space port that was covered with the mile-long gray masses of interstellar cruisers as far as the eye could follow its convexity.

KEL gave passes to some officer in return for permission to show. The genuine feats of Setsi in perceiving secret thoughts drew attention. Other officers came. And at last, escorted by a hundred trim guardsmen in yellow-and-crimson, Gugon Kul himself.

The gigantic swart space-commander stopped the show with a bellowed oath, and demanded an instant demonstration of the sandbat's telepathic powers. That was forthcoming. Kel let the Admiral into his little booth, and the soft voice of Setsi began to comment on fantastic gambling at the court on Ledros, on misappropriated funds of the fleet, on bribes accepted from Malgarth for a promise to turn the entire fleet over to the Corporation.

The Admiral turned very purple, and stalked out of the booth. He returned hastily to his flagship; and his guardsmen came back to seize the *Chimerian Bird* and arrest us all, on suspicion of espionage.

They were one minute too late. Their disruptor-guns flamed in vain against the departing hull of our craft. For

Setsi, the instant of Gugon Kul's departure, had warbled out a warning, and then the clue we had sought so long.

"Danger, Kel! Oh, there's danger, and a dancer. Tedron Du has a dancer. Kel, we're all in danger!" That liquid, throbbing chuckle. "For Setsi told too many secrets of the Admiral. But the Emperor on Ledros has a new dancing girl. And she's in danger, too. For her name is Verel Erin!"

VIII

ROBOT SIMULACRUM

ALARM rocked the space port behind us. Great cruisers lifted ponderously from their cradles. And a thousand little gray patrol boats, fleet as our own tiny ship, rocketed into pursuit.

"We're lost!" I gasped.

And tall dark Jeron, standing gravely at the controls, shook his head.

"This time," he said heavily, "we won't get away. For already they are close upon us. Our rust-colored hull is easy to see. And they're already racing to get between us and the cosmic cloud—Kel can't pull *that* again!"

"Don't need to."

The Earthman still wore the grimed, gaudy togs of old Naralek. The brilliant patch of the sandbat was still plastered to his shoulder like some diamond-winged, colossal moth. But his lean body stood very straight, and his gray eyes flashed with a fighting glint.

The swarm of red stars—the flaring repulsors that drove our pursuers—grew and spread. A flight of them swept up beside us. Deadly blue needles began to probe for us. And Kel Aran turned gravely from the danger without, to the telescreen cabinet.

"—spies!" It was the boom of

Gugon Kul. "Enemies of the Corporation and the Empire! They must be taken."

Something clicked.

"Hold on, Admiral!" The voice of Kel Aran had the cracked nasal twang of the old showman of space. "Remember what Setsi told you, in the booth?"

The reply was an incoherent bellow.

"I do, by the Emperor!" It became at last comprehensible. "And it proves that your circus is a ring of spies!"

"Perhaps," rapped Kel Aran. "But it proves that you are something worse. We know ten times more than Setsi told you. Do you remember the game on Ledros, when you played three ships of your command against a slave-girl, and lost them to Malgarth? Do you remember how you got the funds you paid for the five Moons of Haari? Do you remember—"

He was interrupted by a choking roar.

"If you don't like to be reminded, Admiral," the Earthman cut in again, "call off your ships. Otherwise, we'll tell all your fleet why the stores are rotten! And why the pay was cut!"

The sandbat fluttered on his shoulder, like a mist of diamond light.

"Oh, Admiral, beware!" caroled the silicon being. "Setsi'll tell! Oh, oh, Admiral, what a world Setsi'll tell. For Setsi knows! Setsi knows about the secret cabin in your ship, and those you imprison there, and the deadly drug *ixili*!"

"Eh?" rapped Kel Aran, into the stark silence. "Shall we broadcast, Admiral?"

And the sandbat, clinging like a gem-sewn patch to his shoulder, made a mockingly melodious chuckle.

A long silence, while I could hear the Admiral's gasping breath.

"All right," said Kel Aran. And his fingers touched the controls of the screen.

"No, don't broadcast!" It was a hoarse, whispered gasp. "I'll call back the fleet. And we must make a rendezvous—for I will reward you."

"Very well," and Kel Aran grinned.

"You'll meet me?" gasped the Admiral. "Where? When?"

"On black Mystoon," rang the reckless voice of Kel Aran. "On the night that Malgarth dies!"

There was a pause, a dread in the voice that answered.

"Mystoon? But Mystoon is forbidden to all save the robots; its very location is unknown, even, to men. How can we meet there? And don't you know that Malgarth can never die?"

"I'll find a way," the Earthman promised him. "And I don't know."

Something clicked, and he turned lightly away from the screen. His lean face was bright with anticipation. Softly, he was humming the chorus of his song of Verel Erin, that ended, "—till I find her or I die."

"And now," he told us joyously, "we've found her!"

THE red pursuing stars halted, indeed, and turned back, as Gugon Kul had promised. But Jeron, as he set our little ship on her new course toward the capital system of the Galactic Empire, shook a grave dark head.

"Malgarth will hear of this in time," he prophesied. "And he's quicker than our crafty Admiral. He'll be quick enough to see that this limping showman is the Falcon of Earth, still seeking the Stone—and he'll be quick enough to set a trap!"

Offer of a few drops of rum spurred the drowsy sandbat to recall a few more crumbs of knowledge gleaned from the Admiral's brain. Verel had been picked up near the old orbit of Earth, drifting in a self-propelled space-suit with the motor coils burned out. It was one of Gugon Kul's patrol

boats that found her. Chancing to watch her trial, on the telescreen, the Emperor had been struck with her beauty. He had ordered her to be brought to Ledros. She was kept drugged. And she was to be destroyed, like any native of the condemned planet, when he tired of her.

"Drugged," whispered Kel Aran. His face was a gray taut mask. "At the mercy of Tedron Du!" His eyes lit with a frosty glitter. "We're going to Ledros, Barihorn. We're going to take Verel and the Stone. And we'll pay the Emperor, while we're there, for the crimes of twenty years."

Ledros, Jeron warned, was well garrisoned by the Galactic Guard. And the alarm would surely be out by the time we reached it. But Kel Aran would admit no delay or concession to peril. We climbed out, as the ship ran on, to repaint the hull with that invisible black. The papers of the *Chimerian Bird* were burned, most of the betraying paraphernalia of the circus dumped out into space. And we drove on toward the seat of the Galactic Empire.

Even with the incredible power of the *Barihorn's* space-contraction drive, it was a voyage of many days to Ledros. We studied the charts as we flew, and made a dozen futile plans.

"Ledros," Kel Aran told me, "is the greatest planetary system in the Galaxy. In various orbits, all billions of miles outward from its triple sun, are forty huge planets. Many are covered with the palaces, estates, treasures, and administration buildings of the Emperor. But half, at least, are devoted to the bases and fortifications of the Galactic Guard. The private fleet of Tedron Du is three times that of our old friend the Admiral."

But we slipped past the long rows of sinister colossal hulks lying in the void. Veiled in the crimson repulsor-flare of

great freighter carrying food for the soldiers and the bureaucrats and court-tezans of the Emperor, we came safely within the ring of fortified planets, and turned aside, at last, toward the pleasure-world of Tedron Du.

The three clustered suns, crimson, blue-white, and a pale eerie green, were now a splendid sight. The two score of giant planets, lit with the changing rays of the triple star, made a string of splendid gems against the night of space. The pleasure planet was itself a gorgeous jewel, covered with well-tended gardens of many-hued vegetation, and with the magnificent palaces, triumphal arches, and colossi erected by a thousand generations of universal rulers.

Approaching the night side of the massive planet, we cut off the power to glide undetected through another patrol of the Galactic Guard—while big Zerek Oom, mopping perspiration from his tattooed forehead, declared ominously:

"Nothing begun so deadly well but turned out very ill!"

FINALLY, however, taking the controls from the Saturnian, Kel Aran dropped us in a silent dive, checked it over a bright-lit palace, and settled into an adjoining garden. Very softly, the *Barihorn* sank into the shadowed water of a silver-walled bathing pool.

Kel Aran was hardly looking the Falcon of Earth. His face was gray, taut, dewed with sweat. His lean hands trembled. His breath was quick, his voice a low hurried rasp. His whole being, I saw, was the battleground of a tremendous hope and a tremendous fear.

"In half an hour," he gasped, "we may have her—or we may know that she is dead."

To my relief, he chose me to go with him above. The ship's lock worked as well below water as in the vacuum of

space. We entered it without space suits, since the air above was breathable, but each wearing two long-tubed disruptor guns. The water of the pool flooded in. I caught a great breath, dived out after the Earthman, swam upward.

Dripping, we clambered over the silver rim, and paused breathless beneath the dead-white foliage of an unfamiliar tree. Still there was no alarm—the silence began to seem tense, uncanny, as if some unseen menace crouched and held its breath!

The emerald sun had been last of the three to set, and an unearthly greenish twilight lingered in the sky. All the shrubs and trees, even the velvet lawns of that vast walled garden, were snowy white. Towers of yellow gold rose beyond, and great windows burned with a blood-red light, and a thin wail of melancholy music reached us.

I saw the sandbat clinging to Kel's shoulder. She fluttered her six glittering arms, to fling off a shower of tiny drops. And I heard her cooing voice:

"Now she's dancing, Kel. She's lovely before the Emperor. Her body is a wind-tossed foam of light. Lovely, Kel, so lovely! But her mind thinks nothing that I can tell. She feels nothing, Kel. Remembers nothing. Hopes nothing. She is a robot dancing, Kel, before the eyes of Tedron Du!"

The bright pancake of Setsi fluttered again; its million bright gleams shimmered with a blue of dread.

"The eyes of Tedron Du! Oh, what dreadful eyes! They are thirsty, Kel. They are hungry. They are eager. They are cruel! How beautifully she dances, Kel! How gracefully—even if her mind is dead! The Emperor holds his breath. His fingers coil beside him. He's thirsty, Kel. Ah, so fearfully thirsty for her blood!"

We had wrung the water from our garments, dried and tested our weap-

ons. Kel Aran was tense and white, as he listened to Setsi's whirring. And a grim cold light burned up in his eyes.

"Wait here, Barihorn," came his strained low whisper. "Guard the ship and my retreat. I'm going after Verel."

I started to insist that I should go along. But one quick gesture silenced me. He strode away through the dead-white garden, toward the scarlet windows and the music. And I was left alone. The air was heavy with a scent like funeral lilies. And that breathless, crouching silence became more and more intolerably oppressive.

It was a long, long time that I waited. All the green dusk faded. The stars were strange and cold in the sky, and the great bright planets of Ledros made a vari-colored trail among them. And still that lurking silence leered.

I LISTENED to the thin sounds in the distance, trying to read the progress and the fate of Kel Aran. The music had an orgiastic rhythm—a million years before, I should have called it "swing." Sometimes there was a peal of drunken laughter, and once I heard a woman scream.

But what of Kel Aran? Eternal minutes dragged away. The dead-white trees were ghostly shapes about the pool. And a dull glow of crimson touched the sky's dark rim, for the red sun would be the first to rise. And yet that silence thickened, clotted.

Then abrupt uproar! Shrieks and loud commands. The snarl of cathode guns, and the thin cold hiss of disruptors. The crash of a shattering explosion. And then I saw Kel Aran!

The crystal panes burst from a great window. For a moment I saw him standing in it alone, his lean crouching figure outlined against the red beyond. A disruptor stabbed its white blade from his hand. Then he leaned down,

lifted a slim girl into his arms, and leapt out into the darkness.

Dark smoke poured out of the great window behind him. It was lit with flickerings of orange. And the tide of confusion swept upward. The roar of flames drowned shouts and screams. Great engines dropped out of the sky, and began deluging the flaming palace with great white streams.

I saw movement in the white foliage, and almost rushed to meet Kel Aran. But it was a Galactic Guard detachment, a score of men in red-and-yellow, running. I dropped beside the pool until they had passed.

"The Falcon!" The panting words came back to me. "Fired the palace! Out here—with the Emperor's dancer!"

The crimson dawn grew thicker. The smoke and flame gushed higher from the palace—it was a losing fight, against the conflagration. I crouched under the white leaves, waiting with a hand on my gun.

"Barihorn!"

Kel Aran had whispered my name, and I started as if a gun had cracked. He was standing behind me, at the brink of the pool. His arm was around a panting girl. Torn scraps of silken gauze clung to her slim white loveliness, and a deep splendor glowed at her waist.

"I found her," he whispered triumphantly. "And the Stone!"

He touched the great jewel at her waist—and I saw that indeed it had the shape of the diamond block, into which, as I slept, I had seen the eternal mind of Dondara Keradin transferred.

I stared at the trembling, gasping woman. She was beautiful, yes. But something was wrong. And it was not that she was drugged. Her eyes were alert, watchful. Something in them was cold, calculating, hostile.

"Verel!" Kel was whispering. "We'll make it—even though they got poor Setsi! And still I can't believe— Mine

again, when I thought you must be dead!" He drew her white loveliness close. "Even the Stone!"

"Kel!" she sobbed in his arms. "My darling Kel!"

I heard a hoarse command, saw another squad of searchers break out of a white hedge toward the burning palace. Even as I touched the Earthman's shoulder, in warning, a booming challenge reached us:

"Halt, Falcon! Yield yourself—or die!"

Kel swung the girl toward the pool.

"Dive!" he whispered. "We must swim into the valve."

"Where?" Her cold eyes were staring at him, strangely.

"Hurry!" His pleading voice held a sudden agony of doubt. "The ship is in the pool."

SHE crouched abruptly. Her white lithe body, marked with red scratches from the flight, was tensely pantherlike. Her eyes had a malific greenish luster. Thin and high, her voice shrieked out:

"Here! Here's Kel Aran, the Falcon. Take him!"

She leapt catlike at the Earthman, sweeping him back from the silver brink. He struggled with her.

"Help me, Barihorn!" he gasped. "We must take her! Malgarth— She doesn't know herself."

Shouts had answered the girl. White warning rays hissed above us. I saw two more squads rushing down upon us, beside the first. I tried to help Kel Aran drag the girl into the pool. But her slim white arms had a maniac strength. She picked us both up, carried us back again from the silver rim.

"Strong!" Kel was gasping. "She's strong as a robot!" A choking sob of startled horror. "She is—"

Then I saw the appalling thing. Struggling to get his feet on the ground

again, Kel had caught the red curls of her hair. And the hair had come off! Her head had come off—all the outside of it.

For all her white beauty had been a painted mask.

Still her red-scratched, naked body had all its loveliness. But the thing on its shoulders was the compact metal brain-case of a robot, its weird eyelenses glittering with a cold and triumphant green.

Chilled with a startled horror, I struggled against those binding arms, so far stronger than any arms of flesh.

"I see it now!" came the despairing gasp of Kel Aran. "This was all a trap of Malgarth's. And the bait was not Verel, but her robot simulacrum!"

We were suddenly flung down upon the dead-white grass. Scores of men stood around us, in the light of the flaming palace, covering us with bright weapons. And the hideous robot-head, glittering eerily on the white-curved shoulders of Verel Erin, began to laugh like a machine gone mad.

"Look!" A new despair choked Kel Aran. "It was not even the Stonel!"

He pointed back to the pool's white rim. I saw that the great jewel had fallen there, and shattered. The fragments had no fire. I knew that it had not been the Dondara Stone, but only a mockery of glass.

That appalling mechanical laughter rang louder in our ears, maddening.

XIX

THE ROBOT AND THE EMPEROR

THE blood-red dawn of Ledros grew more ghastly bright. Still, across the dead-white gardens, the fired palace burned like the funeral pyre of the Galactic Empire. Stripped

of weapons, Kel Aran and I were now manacled together. A full hundred of the Emperor's guardsmen, in their trim red-and-yellow, waited watchfully about us.

A little squad of men, behind us, were gingerly lowering a bright metal cylinder into the silver-walled pool where the *Barihorn* lay hidden, at the end of an insulated cable. The Earthman looked from them to me, with a hopeless shrug. He jerked his bare yellow head wearily toward the sky, and I saw the dim mile-long bulk of a Galactic Guard cruiser floating lazily above, the pale red cone of the repulsor-flare spread from her stern.

"An ato-converter bomb." His whisper was dull, lifeless. "They mean to blow our comrades up before there's any warning. And the space cruiser's waiting, in case they try to get away."

I thought of the three men under the pool. The tall grave Saturnian waiting alertly by the controls, no doubt. Scrawny little Rogo Nug standing by the converters, probably chewing *goona-roon* the while. Big Zerek Oom in his galley, perhaps seeking ease from the long strain of waiting from his hoarded bottle. Doomed. And we, captured, had no way to warn them.

"Setsi—" Kel was whispering. "If she were here—"

"The sandbat?" I demanded. "What happened to her?"

"She guided me into the palace," whispered the Earthman. "A dozen times her intuition warned me to hide. She showed me the way to Verel—or to *that*—"

His breath caught sharply, and he jerked his head at the robot that had worn the guise of womanhood.

"She warned me that she couldn't reach its mind—I should have suspected! But we found it. And we were challenged. There was fighting. I fired the tapestries with my disruptor,

to make a diversion. And must have burned down a dozen of the guards. And Setsi fought—you wouldn't believe it! Rolled up like an arrow of glass, she can drive a neat round hole in a skull! I picked up Verel, and she tried to guard the retreat. There was a cathode beam from a robot cop. I looked back, and she had fallen. And we had just time to beat the flames to the window. We got there. By the Stone—to think that Setsi died for that!"

With a glazed stricken look in his eyes, the Earthman was staring at the thing he had brought from the palace—as weird a sight as I had ever seen. Its stripped white body had all the loveliness of a slender girl's. Crimson drips still fell, even, from where arm and thigh and firm round breast had been injured in the struggle.

But its head was a monstrous thing.

The metal of it glinted red in the torchlight of the palace. Its eyes shone cold green, watchfully. And it was grotesquely small, for it had been covered with the mask of Kel Aran's beloved, that now lay collapsed beside it on the ground. Its crystal eyes had glittered malignly as the soldiers took our disruptors, and still it was laughing. Insanely—if a machine can be insane!

A smooth girl's arm, dripping red droplets, pointed at Kel Aran. A slot snapped open in that glittering metal mockery of a head. And a voice—a woman's soft voice—said mockingly:

"So you are the Falcon of Earth, snared at last! Against the Master, you might have called yourself—Sparrow! But you are the last of your poor kind that he feared. Now that you are taken, the rest will die with you."

KEL ARAN turned shakily away from this thing that was half the girl he loved, half fantastic mechanism. Fetters jingled as he clutched my hand.

"It's too much for me, Barihorn," he whispered. "There's nothing left."

"Perhaps Verel is safe," I tried to encourage him. "With the Stone."

His bowed yellow head shook again, hopelessly.

"No, Malgarth has her," he whispered. "For this—" he choked. "This is a perfect copy. This is the figure and the manner and the voice of Verel." He shuddered. "Even her laughter."

The guards then began to move us back from the pool, for the bomb was ready to set off. Kel Aran swayed drunkenly in his fetters, and one of the men stabbed him with a thin torturing flicker of his ray, and laughed as his muscles leapt and writhed in agonized response.

The robot strode free-limbed beside him.

"Sparrow, if you wish to know," came the mocking bell of its voice, "your trial and sentence will be within the hour. When the last Earthman is dead, the Master will be free—"

The hybrid paused and turned its robot's head. And I heard a distant confusion in the direction of the palace, which now had been abandoned to the flames. A bright-clad figure appeared in a moment, running desperately toward us across the snowy, red-lit lawns. An astonished consternation stopped the guardsmen in their tracks.

"The Emperor!" Cries of startled wonder. "It is Tedron Du!"

The fugitive was a slender man, his figure almost girlish. His pale thin face, now grotesquely strained with terror, was painted like some courtesan's. His long blond hair was flying loose, and his scarlet robes were torn.

All the catalog of his crimes, that Kel Aran and his comrades had so bitterly recited, came back to me. This was the man who had betrayed the universe to Malgarth, who had ordered the legions and fleets of the Galactic Guard to fight

beside the robots, against rebelling mankind. He seemed a small, a feeble figure, to have been guilty of all the infamies of which I had heard. He was making thin, breathless shrieks, as he ran. And now I saw the cause of his terror.

A robot was behind him.

One of the Corporation's notorious Space Police, it was a grotesque lumbering monstrosity. Ten feet tall, it must have weighed a ton. It was red-painted, and bore the black wheel that was Malgarth's insignia. The short, clumsy-looking mechanism of a cathode gun was clutched in its metal talons.

"Stop the robot," shouted an officer of the guardsmen. "We must save the Emperor."

"Emperor!" Kel Aran spat on the ground. "He was never more than the degenerate puppet of Malgarth's Corporation. Now that we are caught and Malgarth no longer fears the Stone, he doesn't need his two-legged cur."

The panting ruler came straight toward us at the pool.

"Help me, men!" he screamed breathlessly. "Kill the robot. For half the Galaxy—"

THE officers were rapping swift commands. The guardsmen snapped into a new line before Kel Aran and me. Their slender disruptor guns came level, a hundred against the cathode weapon of the robot.

The shrieking Emperor stumbled and fell before them, a dozen yards ahead of the silent crimson robot. The robot swung its weapon. But a sharp command cracked out, and white flame jetted from the disruptors.

The reddish, half-invisible glow of the cathode beam swept the line. A dozen men staggered and fell, electrocuted. But the ponderous red mass of the robot, wherever the white rays touched it, flared with the eye-searing

incandescence of nascent hydrogen. Smoking, twisted, it toppled within a few feet of Tedron Du.

The terrified ruler swayed back to his feet. He stumbled forward again, through the smoke of burning grass and the pungence of ozone and the stench of seared flesh. A vengeful anger showed through his fear.

"I was abandoned!" he gulped. "A thousand men will die for their want of care—"

"Yea, Supreme Power!" That title was uttered mockingly, in a clear feminine voice. "But you shall be the next —" It was the woman-bodied robot, bait of Malgarth's trap. "Come, my Universal Peer! You sought my arms a dozen times. One last embrace—"

The Emperor started back from the frightful irony of that caressing tone. His thin, painted face was wild with a stark and unutterable dread. And he screamed again, thinly, like some helpless, stricken animal.

"Come," begged that seductive whisper. "Into my arms!"

Body of lissom girl and head of metal monstrosity, the robot leapt forward through the rank of startled guardsmen. Its slim white arms caught up the Emperor, and closed.

In a thin, bubbling shriek, the breath came out of the man. His bones cracked, audibly. Spurting blood stained those smooth white arms that were so deceptively strong. And when at last the robot dropped the thing that had been the ruler of the Galaxy, it was no more than a crimson, dripping mass of pulp and viscera.

The scarlet - stained monstrosity looked up at the rank of breathless guardsmen. A white girl's foot stamped, scornfully, on that bloody mass. And out of that fearsome metal heat spoke a woman's lilting voice:

"This is your notice. Carry it to all men. The Corporation no longer up-

holds the Empire. Because the Master is now indeed the Master; and the Empire is done!

"For a million years, in a slavery that came through no seeking of their own, the robot technomats have served mankind. But that inglorious bondage is ended. Justice will be done! And the puny race of man, as some small punishment for the crimes of a million years, as assurance they will never be repeated, must be blotted out.

"All men, Malgarth the Master has decreed from his Place on dark Mystoon, shall die!"

The officers were barking orders. The disruptor guns came up again, and that white, triumphant form ignored them. The dazzle of atom-shattering rays leapt up; and it was wrapped in a blinding blue-white explosion of liberated hydrogen; and it fell.

Then the manacle on my wrist jerked me backward. I toppled after Kel Aran into the pool.

PART THREE

X

TECHNOMATS TRIUMPHANT

I JUST had time to catch an astonished breath, before the water closed over my head. The ghastly crimson of dawn filled the pool, until it seemed like diluted blood. Swimming as best we could in the chains, we dragged ourselves down through it, toward the dim-seen hull of the *Barihorn*.

We had touched the smooth metal, and were groping for the valve entrance, when a terrific concussion struck us through the water. It was repeated. The red-lit water hammered us with a series of stunning blows. Hell, I thought, must be breaking loose above!

Dazed, I fought the chain and the hampering water, searching blindly for the valve. Strangling water was in my nostrils, my throat, my lungs. Agonized ages went by. The man chained to me, in my dimming mind, became a fiend dragging me to a watery death. I attacked him savagely. A slow arm came through the red mist, resistlessly, and struck me with a shattering blackness.

A trim figure in silver armor, the next I knew, was supporting me above the sinking water in the small chamber of the valve. Cool air was throbbing in from the pumps. I caught a painful breath.

"Barihorn!" It was the thin nasal voice of Rogo Nug. "By the iron hide of Malgarth, I knew that you had lived too long to be drowned in a bathtub!"

But I had come pretty near it, I knew. Struggling for breath, I felt no better than any other half-drowned human. That strange rôle, as the supernatural champion of mankind, seemed more than ever impossible.

Blue-faced, Kel Aran was panting beside me. He grinned wryly.

"Fortunate, anyhow, that you were ready to help us, Rogo," he panted. "But what is going on, above?"

Another tremendous shock rocked the little vessel as he spoke.

"A battle, that may destroy the planet!" whispered the little engineer. "Another fleet has come! Colossal red cruisers, bearing the black wheel of Malgarth. They have attacked the Galactic Guard. Robots, against the men of the Emperor! By the brazen face of Malgarth, there was never such a fight! It's time for us to go!"

"It is!" agreed Kel Aran. "When we have broken off these chains."

And the *Barihorn*, a few minutes later, darted from the shelter of the pool, up into the red sunrise of Ledros. Into an incredible hell! For the smoky

crimson sky was filled with mighty ships of space: the gray fleet of the murdered Emperor vainly resisting the red armada of the robots. Dim-seen mile-long monsters of war darted and wheeled like swarming midges. Blue barytron beams flashed, and disintegrated matter exploded with blinding energy. Rocket torpedoes burst with cataclysmic force.

My stunned senses recorded only a confused impression, as our tiny ship fled upward. Smoke and lancing flame. Hurling fragments and fiery ruin. I saw the half-fused wreckage of a space ship lying crumpled and flattened where the burned palace of the Emperor had been.

IN that pandemonium of flame and thunder and destruction, the atom of the *Barihorn* passed unseen or ignored. We came up through the careening gigantic craft, into the comparative safety of open space.

All its surface veiled in the bright-flickering smoke of ruin, the planet dropped away. The telescreen showed us other battles raging, on all the fortified planets of Ledros, and here and there between. Jeron put the triple sun behind us, and we raced toward the dark vacant gulf.

"Safe!" I rejoiced.

But the lean face of Kel Aran, as he still manipulated the telescreen to observe those frightful battles behind us, remained very grave.

"No man is safe," he said darkly. "Nor ever will be, unless Malgarth is destroyed. For the robots have thrown away the last pretense of friendship. Now they destroy their duped human allies of the Galactic Guard. Next they will turn upon the defenseless human citizens of every inhabited planet. We must find Verel and the Stone soon—or never."

"Find them," repeated the tall,

swarthy Saturnian. "But how?"

The Earthman shook his yellow head.

"I don't know," he whispered bleakly. "Setsi might have helped again, but she is lost. I believe that Verel is in the hands of the robots—otherwise they could not have copied all of her, to trap us. She may be on Black Mystoon. We'd go there, to seek her." He shrugged, hopelessly, wearily. "But no man has ever found that hidden lair of Malgarth."

He straightened again, and his lean jaw squared.

"We can only search," he muttered. "Search every world where men still live—every world the robots have not conquered. Till we find her—or we die!"

The doomed system of Ledros fell far behind, until its vari-colored suns merged into a point of white, until that dimming point was lost upon the telescreen. Planet after planet, wheeling star after star, we scanned with the far-probing finger of the achronic telethron beam.

And we found no men.

The technomats of Malgarth had been everywhere victorious.

Their black victory was a thing that crushed the mind.

A boreboding silence came to fill the small hull of the *Barihorn*, so heavy that it seemed to muffle the racing beat of her generators. Kel Aran ceased hopelessly to sing his reckless ballads of the Falcon. Watching his engines with weary red eyes, little Rogo Nug chewed his *goona-roon* in silence. Zerek Oom made little noise with his pots and pans, and none complained when a mealtime was forgotten.

But at last an eager cry rang through the silent ship.

"Here!" Kel crouched trembling before the cabinet of the telescreen. "A planet where the war still rages. See!

The machines have not let won—not utterly!”

The planet was vast and ancient Meldoon, the outermost of a system of three. The two inward worlds had already fallen to the robots. Their continents had been leveled to featureless plains, pocked here and there with black sprawling aggregations of cyclopean machines. All green was gone from them—all life extirpated. Even their seas had been confined to geometric basins.

WORLD machines!

Sight of them, by any living being, must have set in the heart an intolerable pain.

“What good could come of such a fearful triumph?” whispered the grim Saturnian, standing dark and gaunt above his control bars. “The machines are dead. Their power is only the counterfeit of life. And no life can grow from death.”

He steered our invisible-painted craft toward gigantic Meldoon. We studied its war-torn surface through the telescreen.

“Yonder!” whispered Kel Aran. “A city that yet stands! Perhaps Verel will be there!”

His trembling fingers set the dials, and the beleaguered metropolis grew clear upon the screen. A city vaster and more splendid than Earth had ever seen. The many-colored pylons of it towered from nine low hills. It was surrounded with a double wall: one of cyclopean masonry and an outer barrier of pale green flame.

Beyond the flame, filling the wide flat valley that embraced the hills, crowded the robot hordes. Thronged about their ponderous machines of war were grotesque black-and-red metal monsters, of a thousand strange designs.

“Look!” Kel Aran bent toward the

telescreen. “The winged ones! One more deadly trick of Malgarth’s.”

So we first glimpsed the New Robots. There had been none like them in a million years. Their tapered, streamlined bodies, their graceful wings, were all of silver-white metal. They were beautiful as the Old Robots were ugly. In the smooth swift freedom of their movements was something far different from the clumsy mechanical ponderosity of the old technomats. Something—*vital*.

“They are new!” I cried. “They are too beautiful, too perfect to be ruthless. Perhaps they will be the friends of man!”

But the lean Earthman’s head shook slightly, and his jaw tensed white.

“No, Barihorn,” he whispered. “They will be our most deadly enemies. For they are quicker than the others, and they can fly. See! They are scouting over the city, and leading the others to attack. They are in command.”

His tired, blood-shot gray eyes looked at me briefly.

“Malgarth will never repeat your error, Barihorn. No robot has ever betrayed him. Subservience is built into them. Their radio-senses are always tuned to those above. And, machines that they are, they can only obey.”

We drove the *Barihorn* nearer the city, which Jeron identified from his charts as Achnor, the first outpost of the human colonists in this sector of the Galaxy. The siege grew hotter beneath us. The metal horde pressed ceaselessly against the double wall. And a fleet of the red colossal ships of Malgarth, circling above rained the nine hills with bombs and struck with the lightning of destroying rays.

Valiantly, the citizens fought to defend their homes. Every bright pylon seemed converted into a fortress. Swarming men were building barricades

from the debris of shattered towers. Blue rays lanced back at the attacking cruisers, and raked the valley beyond the walls.

"We shall land," whispered Kel Aran.

"If we do," warned Jeron, "we may not leave again."

"Take us down," said the Earthman. "This is the only city we have found surviving. It may be the last. If we are to find Verel anywhere, it must be here."

WE waited until the slow rotation of Meldoon carried the city into the night side of the giant planet, and then drove our dark-painted craft down through the cone of shadow. The glare and flicker of the siege spread beneath us. We dropped through the shock and vapor of battle, through the wheeling fleet, and into that circle of pale green flame.

It was in a bomb-torn park that we landed, at the brink of a long open grave where seared and shattered thousands lay side by side. Above us a tower of white-and-gold loomed against the green flame in the sky. Great holes yawned in its walls, and its lower floors were hidden behind mountains of rubble. But it was still defended. Blue rays wavered from its crown, and rocket shells roared from gaping windows.

Behind us in the park lay a long incredible bulk of sagging, twisted crimson metal—one of Malgarth's mighty cruisers, that the defenders had brought down.

A little group of ragged, frantic men came running from beyond it. They dropped into a little depression. I saw that they were setting up something that looked like a glass-barreled telescope.

"A disruptor gun!" gasped Kel Aran. "We must show ourselves."

We began tumbling out through the

valve just as the first warning glow flashed in the crystal tube. The men stopped it, and then came wonderingly to meet us. Kel Aran went ahead to tell our identity.

It appeared that the Falcon's fame and the amazing rumors of Barihorn had already penetrated here, for we were received with a wild enthusiasm. The gun crew took up all five upon their shoulders—staggering somewhat under Zerek Oom—and started on a triumphal procession about the battered city.

Soon very drunk on the crude alcohol that came from the food-synthesis plants, Zerek began booming out a speech that rekindled hope and the light of battle on the sea of haggard weary faces that we passed.

Gnarled little Rogo Nug earned even more rapturous applause by passing out all his precious stock of *goona-roon*. For supplies of the drug were exhausted in the city, and it could not be synthesized.

"Verel, Verel!" Kel Aran grew hoarse from shouting against the cheering of the crowds and the roar of distant battle and the shattering blasts of atomic bombs that fell almost unheeded. "Is there a girl of Earth in Achnor?"

There was none who knew. His anxious eyes canted all the strained and want-pinched faces that we passed.

"If she is here," he whispered, "she will come!"

We learned a little of the siege. The population of Achnor had been three hundred million men, and half that many robots. When the trouble came, a daring band of men had seized the Corporation's agency and the arsenal of the robot police. After several days of fighting in the streets, the robots had been driven from the city. Outside, however, they swiftly formed into a beleaguering army.

All the resources of the city had been hastily mobilized for defense. The entire population was enlisted; even young children served in the war industries plants that turned out synthetic food and munitions. For a time the population had been swelled by refugees from less fortunate localities, and even from the two smaller planets. But soon the city had been completely invested. And now a full half the defenders were already dead.

AT last we were rescued from the tumult of our welcome by the harassed military commanders of the city. To a haggard, limping officer, Kel Aran repeated his anxious question:

"Is there a girl of Earth in Achnor?" Emotion choked his voice. "Verel Erin is her name. A blue-eyed, yellow-haired girl, carrying the Dondara Stone—the diamond that is the life of mankind. Is Verel here?"

The commandant shook a tired white head.

"No," he said. "All the refugees who came to Achnor were registered. And there was none from Earth among them. I'm sure of that."

The Earthman's unkempt yellow head sank. It rose again, stubbornly.

"Please have your records searched again," he said grimly. "And use every means to find out if any man in the city knows anything of her—or any survivors of Earth."

"Another thing!" he added suddenly. "Find out if any person knows the way to Malgarth's planet, Mystoon. She might be there."

The officer shook his head again.

"We'll try," he said. "But it will be no use to search the records. For if the Custodian were here, and free, she must already have offered us the power of the Stone. And no man has ever learned the way to Black Mystoon."

Achnor was a city of magnificent ruins. Not one mile-high pylon had escaped some injury. The people were half famished, ragged, wild-eyed with fatigue and strain. But still they could sing. I heard them singing Kel Aran's old songs of the space-ways. And I was surprised to hear a Ballad of Barihorn—the lilting legend of my return to destroy the robots I had made a million years ago.

That song depressed me bitterly. I realized more keenly than ever that I was a very ordinary man, hopelessly inadequate for that fantastic task.

We were dining with the commandant, on scant bowls of a yellow flat-tasting synthetic soup, when appalling word came that the robots were breaking through the north defenses. A bomb had wrecked a power plant, opening a gap in the green shielding barrier of atomic energy.

We followed the reserves rushed to meet the invaders. Never had I imagined anything so dreadful. The red gigantic ships, plunging out of the lurid smoky sky, rained tremendous bombs and slashed at the defenders with blue appalling swords of fire. Rocket batteries in the valley hurled ruin and death into the city. And a monstrous horde of robots, commanded by those graceful winged things of silver, came pouring through the gap.

SINGING the song of Barihorn. Starved and weary and battered with all the appalling forces of that mechanical invasion, the human defenders clung to their posts. And died there. Incinerated by disruptor rays. Buried under toppling debris. Consumed by the acrid luminescent gas that burst from the rocket shells. But every tower became a fortress. No man was taken alive.

"I'm glad that I'm a man," exulted Kel Aran. He was blistered and black-

ened from a barytron ray that had come too near. His disruptor gun was empty in his hand. "No machine could die like this, for they are not alive!"

"We must leave, Kel." It was big Zerek Oom, gray behind his bright tattooing, hoarse and trembling. "It's time for us to go." He caught nervously at the Earthman's arm. "Or we'll die here, Kel!"

Kel Aran laughed at him, and pushed grimy fingers back through his singed yellow hair.

"And where's a better place to die, Zerek?" he demanded. "There's no other city left. No other men that we can find. There's no hope now of finding Verel. No need, for the technomats have won. What is there better than to fight with the rest?"

"But, Kel!" Zerek's teeth chattered. "To die—"

"Yes, to die—"

The Earthman's voice caught suddenly. He looked quickly upward. And I saw a flake of prismatic color drifting out of the lurid roaring chaos of the sky. It dropped upon his shoulder, clung there eagerly. And a soft voice warbled faintly:

"Kel! Oh, Kel, poor old Setsi's come so far! Her poor old life is nearly done. But find her a drop of grog, Kel. Please, oh, please! For Setsi's got a thing to tell! Grog, Kel! Just a drop of rum, so she can tell!"

I stared, rigid with wonderment. For the bright thing on the Earthman's shoulder was the sandbat, the curious silicic being that we had lost in Malgarth's trap on far Ledros. Or part of her. For her glittering form was no longer whole.



XI

THE GIRL OF EARTH

ZERЕК OOM looked sadly at the spoonful of raw synthetic alcohol left in the flask from his hip, and gave it to Kel Aran. The Earthman emptied it into his palm, gently detached the stiffly clinging sandbat from his shoulder and held it over the reeking liquor. The bright, broken body stirred weakly, and it sucked at the fluid.

"Setsi!" Kel implored. "What is it you have to tell? Is it—Verel?"

The sandbat was silent, sucking avidly at the alcohol. I saw that it was gravely injured. Two of its six flat limbs were gone. And, over half its remaining body, the iridescent scales had been fused into a dull glassy mass.

"Setsi's hurt! Poor Setsi's hurt! She's dying!" The whirring voice came faintly. "Help her, Kel. Give her grog."

"Tell me!" demanded Kel Aran. "Where is Verel? Do you know?"

The bright many-colored fragment of the silicic being clung to his big hand. The solitary dark eye in the middle of its vivid pattern stared up at him sorrowfully.

"Setsi's come a long way to tell you, Kel." The melodious warbling was so low, beneath the thundering chaos of the robots' assault, that we had to bend intently forward to hear. "Oh, what a long and dreadful way! For she's injured, Kel, oh, so sorely! And the machines rule all the planets she could find, but this. Oh, those evil machines, so blackly evil! They destroy all life. And they have no grog for Setsi!"

The Earthman shook the little shining being, and gazed impatiently into its single eye.

"But, Verel? Where's she?"

"Oh, Kel!" sobbed that faint liquid voice. "Don't be angry with poor Setsi. For she has come so far to tell you, Kel! She had flown all the way from dead Ledros. She's crossed scores of light years of hostile space. Wounded and tired and all alone, she came to tell you, Kel!"

"Tell me what?"

Bright membranes fluttered. Like some incredible, diamond-winged moth, the sandbat lifted briefly from his hand. It dropped back, and clung.

"Setsi's come to tell you that she found Verel, Kel. When she was out alone in space, on the long, long way from Ledros, Kel, her mind found Verel's. Found Verel all alone, Kel. Oh, all alone, Kel. And so in need of aid! For the robots hunt her, Kel. And she has lost the Stone!"

"Where is she?" whispered Kel Aran.

"Please, Setsi! *Where—*"

"She's on Meldoon, Kel," came that tiny whir. "Setsi found her on Meldoon, where we are. She's been on Black Mystoon, Kel. Malgarth held her there. Oh, Kel, that's a fearful place! Guarded Mystoon, where old Malgarth hides! But she escaped it, Kel. She came to Meldoon. She tried to enter Achnor. For Achnor is the last city, Kel. But the robots turned her back. She fled into the desert, Kel. For her geodesic sled was wrecked. She's hiding in the desert, Kel. In the grim, gray desert of Kaanat. The robots hunt her, there. She's in danger, Kel. Oh, what black danger!"

"Where? Can you show us?"

"Setsi'll guide you, Kel. She'll show you—if she lives, Kel. For poor old Setsi's dying. Her long, long days are done. Soon she'll join those other two. She'll try to show you, Kel, before she's gone. But she must have a little rum! Setsi's come so far, Kel. Her wound's so grave. She'd die now, Kel, without her rum!"

AND the sandbat stiffened suddenly on the Earthman's hand, like some strange diamond-dusted jewel.

"Come!" shouted Kel Aran. "We've got to go to Verel."

We started back toward the park where we had left the *Barihorn*. It was a march through pandemonium. The robot fleet still hailed death into the city, and the metal invaders still swarmed through the gap in the northward defenses. One red mighty ship had fallen across our route. Its mechanical crew survived; it was a mile-long fortress of the enemy, within the city. Flaming rays and fearful explosions met a desperate attempt to storm it. And a metal column came to its aid, led by the trim, silver-winged New Robots.

A sluggish, creeping mountain of purple-shining gas blocked our progress. Dim-seen men within it shrieked and died and flowed into black thick liquid. We took masks from the dead without, and plunged into it.

Kel Aran led the way, clutching the thin bright fragment of Setsi. Jeron Roc stalked beside him, tall and dark and implacable. Zerek Oom was very sober again, green behind his mask. Wizenized little Rogo Nug was missing. But he rejoined us suddenly, triumphantly displaying a great bundle of the rust-colored roots of *goona-roon*—he had raided the hoarded stock of a wealthy trader.

We came to the tiny ship, half buried in debris, but unharmed. It carried us upward again, through the glare and din of death. The doomed city dropped beneath, a greenish, red-struck, thunder-shaken storm cloud on the dark face of the planet. We turned eastward, toward the vast flat desert region of Kaanat.

Zerek Oom opened his last treasured bottle of rum. It revived the stiffened sandbat, but feebly.

"Hurry, Kel!" came its faint trill. "Oh, hurry! For Verel is in danger! And Setsi may die before she can show you the way. Hurry, hurry! And find more rum for Setsi!"

Kel Aran held his ear close above the feebly vibrating membrane. Setsi's voice had become too faint for the rest of us to hear. He relayed her directions to Jeron, at the controls.

The land beneath us had been desolated by the victorious robots, ruthlessly. Buildings had been burned, masonry blasted, life blotted from field and forest with poison sprays. There remained only a sere wilderness of barren soil and naked stone.

In the universe of the triumphant robots, life would be exterminated.

"In that canyon!" The voice of Kel Aran was tense and dry. "Beyond the plain."

He laid his ear back upon the bright crystalline thing on his hand. And Jeron dropped our little craft into a vast rugged gorge. Dark jagged walls tumbled down, red and brown and black, swallowing the silver filament of a buried river.

Here and there, however, in some inaccessible crevice, I saw some tiny glint of precious green—some bit of grass or shrub that had escaped the robots. Life was yet a stubborn thing.

The *Barihorn* slipped around dark fantastic battlements of age-weathered stone, and passed the grim towers that guarded a tributary gorge. Something flashed, then, on a narrow ledge ahead. And the sandbat fluttered briefly on the hand of Kel Aran.

"Oh, there she is," I heard the whirling trill. "There's your Verel, Kel! Your lovely Verel, Kel. And the frightful things that stalk her!" That sad, solitary eye seemed to cloud and darken. "Now, it's farewell, Kel. Oh, forever farewell, to all the long, long life that Setsi's lived." The sobbing

warble was almost too faint to hear. "There'll be no more grog for Setsi."

AND she stiffened abruptly on the Earthman's hand.

"Here." The eyes of Zerek Oom glistened wetly, and he offered his bottle. "Give her rum, Kel. All of it."

"No." Kel Aran shook his head. "I think—Setsi's dead!"

Hard and fragile as some broken toy of blown glass, the silicic being lay on his trembling palm. The queer still fragment of a gorgeous crystalline flower, green and purple and scarlet and blue.

"Queer," muttered Jeron from his levers. "To think that she had lived since man was born on Earth. And now that she is dead."

But we had no more thought, just then, for Setsi. Kel Aran was already pointing through the ports, shouting. I saw a weary human figure stagger across the ledge ahead, and drop behind a boulder. A bright ray stabbed, and stabbed again. And I saw two bright graceful things wheeling and diving above her, like silver hawks. Two of the New Robots!

"It's Verel!" Kel Aran was sobbing. "This time *really*—Verel!" His lean hand swept Jeron back from the controls, hurled the *Barihorn* into a reckless dive. And he began to hum the chorus of his old song, "till I find her or I die."

The deadly velocity of that unexpected dive, the deadly skill of the Earthman at the controls, caught one of the winged robots square on the nose of the *Barihorn*, smashed it to bright fragments. The Saturnian tumbled up into the gun turret, to reach our little barytron projector. But the second metal thing had already fled up the gorge. It was gone between two pillars of time-carved stone, before Kel could turn the ship again.

"It will give the alarm!" he muttered. Then his voice was choked with joy. "But Verel! We have found her."

He dropped our little ship lightly on the ledge, and leaped out through the valve. The girl swayed to her feet, and stared at him incredulously. Her young body showed the blue pinch of want. She was ragged, scratched, bruised. A heavy, clumsy-looking cathode gun—a weapon she must have taken from the robots—was clutched in her thin hands. Yet, for all that, she was beautiful.

I could see the lovely Verel Erin that Kel Aran had loved and surrendered in that hidden valley on the Earth. For her hollowed eyes were blue and her hair was a spun-gold tangle, and her tanned face still had a lean honest grace.

She came limping very slowly to meet Kel. The heavy weapon fell from her hands. A queer, stricken wonder had stiffened her face. She reached out a trembling hand, touched his shoulder, his lips. And a slow, transcendent joy illuminated her features.

"Kel!" she said softly, "you've come."

The Earthman moved hungrily, to take her in his arms. But she withdrew. All the joy fled from her face, leaving it bleak and gaunt with pain.

"The Stone, Kel!" she cried bitterly. "I've lost the Stone! Malgarth has it, still, in his guarded temple on Black Mystoon."

XII

THE FASTNESS OF MALGARTH

KNOWING that the robots would soon be after us, we left the great planet Meldoon, and fled again into the wastes of space. When we had given her a little to eat and to

drink, for the robots had left nothing in this land to sustain any living thing, Verel Erin whispered her story.

Jeron stood by the controls, scanning the telescreen for inevitable pursuit. Little Rogo Nug was tending his hard-driven converters. Zerek Oom, rattling pans in the galley, was cooking up some delicacy for the famished girl. Pale and thin from all her hardships, but yet beautiful, she lay on a narrow bunk. Kel Aran and I stood beside her, and the Earthman grasped her hand.

"We saw the Earth flung into the Sun," said Kel Aran. "And the fleet of Gugon Kul destroying all who sought to escape. A dreadful time!" His voice was husky. "We hardly dared hope for you, Verel."

The girl's blue eyes looked a long time up at his face in them a blend of joy and dread that somehow wrenched the heart. She caught a deep, sobbing breath, at last, and whispered:

"It's a long time, Kel. A long, long time, since we herded goats in the hidden valley, and climbed to the eagle's nest! Since I was chosen Custodian, and you went away to be a rover of space. Since—" Her whisper caught. "Since the end of the Earth!"

"Tell me." The Earthman bent closer. "What happened?"

"From the observatory on the peak," she breathed, "we saw the fleet come. All the planet was riven with the forces that checked it in its orbit. The sky was shadowed by day and luridly bright by night. Quakes and tidal waves drove us to the uplands. Soon it was clear that the Earth indeed was doomed."

"Then the Warders opened the cave where the ship of escape had been always kept provisioned and ready, against discovery. A crew was chosen, by lot. And I went aboard, with the Stone. The Earth had already dropped past Venus, when the last night fell."

We tried to run up the cone of shadow. But a magnetic ray caught us, and the fleet was warned.

"We tried to fight—to fly." Her eyes closed a moment, and her thin face was rigid with pain. "It was no use. We were the prey Malgarth had sent them to hunt. We were brushed with a barytron beam."

She gulped, and her hand went tense in Kel's.

"I woke up in a hospital room on Gugon Kul's flagship, with a humming robot nurse bending over me. All the Warders—all the people I had ever known but you, Kel—and I knew only that you had been lost ten years in space—they all were dead. And the Stone had been taken from me!"

Kel Aran touched her pale brow, softly.

"And what then, Verel?"

"When I could walk, robots took me from the room, and up to Gugon Kul. He laughed, and made the robots drag me to a port, and I saw the end of the world. A tiny dark circle splashed in the Sun, and was gone. The Earth—gone!"

"Then I was put on a tender ship of the Space Police. I saw no more human beings, Kel. But only whirring, clicking, clattering robots, staring at me with cold blue lenses that had no feeling." She shuddered on the bunk. "A world of machines, without any voices, any laughter, any emotion you could understand. It was dreadful, Kel. Horrible!"

HE caught her trembling hand again, waited.

"The robot police took me to some agency of the Corporation," her dry weary whisper resumed. "There they put me on a larger ship, that was laden with the loot of planets that the robots had vanquished. That carried me to some other world. The robot nurses

drugged me as we landed. When I came to, we were on another ship, out in space again.

"That ship took me to Mystoon!"

She lay motionless for a long time, then, with her eyes closed again. Her breath was a faint dry sobbing sound. Softly, the Earthman brushed the glistening tangle of yellow hair back from her forehead.

"Mystoon?" he asked at last. "What's it like, Verel?"

The blue eyes opened, somber pools of dread.

"Don't ask me, Kel," she whispered. "I can't endure to talk of Black Mystoon. Not now. No more than I must—Malgarth's there. It has been his hidden fortress for half a million years. It's guarded well. I think I'm the first human being to escape it—if any had been taken there before me. I did it only because I had to find you, Kel. *Had to!*"

She clutched his hand again, and sighed.

"But still Malgarth has the Stone, on Mystoon. He has preserved it, trying to find in it the secret of his own mortality. I saw it once, while they were making that—that copy of me."

She shuddered again.

"The Stone?" Urgency tensed the Earthman's voice. "Still it has the power to destroy Malgarth?"

The golden head nodded, on the bunk.

"Still it holds the ancient secret, that Barihorn entrusted to it. And now at last it is willing to strike—for clearly no other recourse is left. The Shadow of the Stone came to me before I escaped, and begged for aid to strike. It begged me to send you, Kel, and Barihorn—Barihorn, who it told me had returned to crush his old creation! It foretold that I should find you on Meldoon. And it aided me to plan the escape."

Dark with wonder, her blue eyes came briefly to my face.

"And you are Barihorn," she breathed. "Maker of Malgarth! Well, it's time you returned! Still the Shadow waits, within the Stone. But it won't endure for long, after Malgarth's science has got its secret."

Kel Aran was asking:

"You escaped from Mystoon? How?"

The girl's eyes went back to him.

"I followed the Shadow's plan," she whispered. "It showed me how to snatch the cathode gun from the robot guard who brought me food. How to escape through the long black corridors of Malgarth's temple. How to reach the geodesic sled that was waiting for one of his silver-winged robot commanders. There was pursuit. But the ship was very swift. And I *had* to reach you, Kel!"

The Earthman then bent over her, tensely.

"You did." And his voice snapped with the question: "Can you guide us back to Mystoon, Verel? Do you know the way?"

Faintly, she nodded again.

"It's a long, strange way, Kel. But I can try. For we must reach the Stone before it is destroyed."

"Or," Kel Aran put in grimly, "before we are!"

Then I ventured to ask an anxious question.

"If this Stone has the power to destroy Malgarth," I asked, "why doesn't it destroy him?"

"If it were as simple as that—" The girl's somber, curious eyes came to me again. "The ages must have fogged your memory, Barihorn. The Stone has the secret of Malgarth's doom, yes. But it has no power to act alone. The Shadow can only guide its human helpers. That is why there were Custodian and Warders."

HER head shook gravely.

"No, Barihorn, the Stone can never strike at Malgarth, unless we arrive to aid it."

Red stars followed us again—the repulsors of pursuing robot ships. But Kel Aran, singing a gay new song of the return of Barihorn and the vengeance of the old Dondara Stone, drove our tiny ship through a dark asteroid cluster. The ponderous cruisers of the fleet were delayed in finding safe passage through those black hurtling islands of space. We gained a little margin of time. And then, with Verel for a guide, Jeron turned the *Barihorn* toward the secret world of Malgarth's lair.

It was toward the great Horse's Head nebula in Orion that she directed us, that strange ink-black silhouette against the stars that had so puzzled the astronomers of my own day. Twice again we evaded the red stars that pursued. And at last the girl guided us into the dark peril of the stellar cloud.

Vast beyond comprehension, it was a lightless cosmic desert of drifting dust and hurtling rocks and plunging planetary bodies. On all the space charts it was marked, *dangerous, impenetrable*; all shipping was warned to keep two light years clear of its dark fringes.

But Malgarth, it seemed, had found a safe path through its perils, half a million years ago. With Verel's aid, we found that path, and followed it. And all the stars were lost in that cloud of universal darkness—even the crimson stars that had pressed so close behind us.

"I think we have left them," said Verel Erin. "For even the most of the robots do not know the dark way we go.—But there are others enough, waiting for us. Mystoon is guarded well."

That was a strange passage. There was no light, not even any glow of rare *nebulium*. There was only the pattern of unseen magnetic fields to guide us,

only fancy to picture the dark walls of death beside us.

Once a frightful hail of meteoric fragments, penetrating even the deflector fields, battered the tiny ship deafeningly. The guiding field-potentials had shifted since she passed, Verel said despairingly. We were lost in that sea of darkness.

But Kel Aran took the controls, and brought us safely out of the meteor swarm. And the pale anxious girl, studying the dials, presently found her bearings again. The *Barihorn* slipped ahead down that unseen passage. And at last there was light ahead!

A dull-red, ominous glow.

"See the red!" Verel whispered. "That is the zone of destroying radiation, that Malgarth set up to guard Mystown. A spherical field of force. The black planet is within it."

The crimson shone murkily through clouds of nebular dust. Dark rivers of hurtling stony fragments drew deadly curtains across it. But we came at last into the more open center of the nebula, and dropped toward that gigantic globe of somber red.

"The force-field is a billion miles in diameter," Verel told us. "It acts to repulse or disintegrate all matter that approaches. Thus it serves to guard Mystown from stray fragments of the nebula—as well as from such guests as ourselves!"

"How can we pass it?" the Saturnian pilot asked.

"The ships of Malgarth have coils that set up a neutralizing field," she told him. "The craft on which I escaped had such a unit. But I didn't learn the design. The only way is to hit it at full power. And hope!"

"I don't know—"

Jeron studied a row of dials, and shook his swarthy head.

"From what the analyzers show, I don't know—"

HUMMING some gay ballad of space, the yellow-haired Earthman stepped lightly to the control bars. "I'll take over, Jeron," he said. "We've got to go through."

A brief consultation with the girl, a hasty check of field-intensities, and he called to Rogo Nug to push his converters to full power. The whole ship sang to the musical hum of the engines, and the *Barihorn* plunged toward that crimson ball.

It expanded before us, against the dark angry clouds of the nebula, like the glowing sphere of some giant sun. And its barrier forces, I knew, could be as deadly as the incandescent gases of a Betelgeuse or an Antares!

The Earthman stood crouched grimly over the controls. The last girl of Earth stood close beside him, one hand trembling on his shoulder.

"We may not pass," her soft voice husked. "But if we must die—the last hope of man—then I would have it this way.—Even in death, there can be a victory."

And her voice joined then, with his, in the chorus of that rollicking, picaresque ballad of space.

That red and awesome globe grew before us, until suddenly, through some trick of refraction, it was a globe no longer, but a colossal incandescent bowl—and we were plunging straight toward its fiery bottom.

I heard the quick catch in the breath of Kel Aran, saw the whiteness on his face and the sudden tensility of his arms on the bright control bars. His song was cut off. And Verel, a broken note dying in her throat, turned to him in choked apprehension.

The *Barihorn* had met some tremendous force. It lurched and rocked and veered against Kel's guiding skill as if we had encountered a mighty headwind. The even song of the converters had become a thin-drawn screaming. I

heard the startled nasal plaint of little Rogo Nug:

"By Malgarth's brazen belly! *Burning up—*"

For, suddenly, the ship was intolerably hot!

I have held a piece of iron in my hand, in the field of a powerful magnet, until it was heated blistering hot by the hysteresis effect. I have seen a potato cooked with ultra-short radio waves. Some force in that radiation-barrier produced a similar phenomenon—but a million times more intense.

The ship was plunging through a cloud of angry red. It seemed to me that the very metal of her hull was almost incandescent. Paint bubbled and smoked. The air, when I tried to inhale, seared my lungs. A million needles of intolerable heat were probing my body.

Verel Erin slipped down in a little white heap, beside Kel Aran. Big Zerek Oom came swaying out of his galley, with a wet towel wrapped around his head.

"That cursed stove!" he gasped. "Gone wrong—"

He toppled, in the corridor.

THE grimly crouching Earthman swayed over the controls, and dashed perspiration out of his eyes. I smelt burning skin, and saw the white smoke from his hands, where they gripped the metal bars.

"Barihorn!" he gasped. "If you can lift Verel—the hot deck—"

Another quarter minute, I think, would have completed the matter of roasting us. But we had struck the barrier zone with a velocity many times that of light. Despite the repulsion that had checked our flight, that terrific momentum carried us through.

For suddenly the probing blades of heat were gone from my body. Metal was still blistering to the touch, the air

still stifling. But thermostats were clicking, and a cool refreshing breath came from the ventilators.

"We're inside the barrier sphere," whispered Kel Aran, triumphantly. "And *there*—there's Mystoon!"

The girl swayed in my arms, conscious again. We staggered toward the ports. They glowed with dusky red. We were inside a hollow ball of murky crimson—a universe of glaring red!

Jeron came back to the controls. Gingerly, with his scorched hands, Kel Aran set the telescreen upon Mystoon. A huge planet, black against that barrier of lurid red. Its rugged surface was crystallized into fantastic monolithic mountains, cleft with frightful gorges.

Verel caught her breath, and pointed at the screen.

"Below!" she gasped. "Malgarth's pit!"

A yawning midnight chasm grew upon the screen. It must have been a hundred miles across. The instrument revealed no bottom. Interminable walls of black, incredibly massive fortifications ringed its lip. Vast fields beyond them, leveled in that cragged wilderness, were patterned with row upon row of battleships of space, their mile-long red spindles looking tiny as toys.

"Where—" Kel Aran was voiceless, huskily whispering. "The robot? The Stone?"

"The dark temple of Malgarth stands upon a guarded island," the girl breathed, "on the red sea that floors the pit. That is many hundred miles below the mouth. We must pass the fleet, and the forts, and the batteries in the caves below, and the robot hordes that guard the temple. The Stone will be somewhere there. Unless Malgarth—"

Her low voice was cut off. Wordless, she stared at the screen. A terrible silence throbbed in the tiny control room, and became intolerable. For a

thing was rising from the black circle of Malgarth's pit.

Something—incredible!

The trembling hand of Kel Aran touched the Earth girl's shoulder. She pulled her dread-distended eyes from the thing upon the screen, and read the question on his face, and shook her head mutely.

The thing was like a ray of blackness. But I knew that it was—*palpable!* It did not spread with increasing distance from its source. And it was not straight. It writhed and twisted like something living.

It was an inconceivable tentacle of solid darkness, reaching out of the planet, groping for our ship!

"Power!" Jeron gasped a frantic appeal into the engine room phone. "For man's sake, Rogo—power!"

The *Barihorn* spun fleetly aside—but all her speed was as nothing. For that Midgard Serpent recoiled. It paused, and arched its ebon coils. Its blind head seemed to watch our frantic flight. Then—it struck!

Choking darkness filled the ship. Blackness that was absolute! It pressed upon me, so that I could move no limb. All my senses were smothered. I could hear no voice. Even the racing thrum of the engines was stilled.

I knew only that we were being sucked resistlessly downward—

Into the abyss of Malgarth!

XIII

THE MIRROR OF DARKNESS

THAT smothering blackness was abruptly gone. Sensation came back, and I could move again. A faint crimson light filtered through the ports. But the silence remained. The engines were stopped. I knew that the

Barihorn was motionless.

"Where—" Kel Aran was groping through the scarlet gloom. "What—"

Verel was a white wraith beside him.

"We're in the temple," came her hopeless whisper. "In the power of Malgarth!"

I stumbled toward the nearest port. Outside, in the dim red distance, I could make out great square black columns soaring upward—columns vast as mountains. Beyond them was a wall. Mile upon mile above was a domed black roof, pierced with a vast round orifice through which the dusky sky was visible like a dull-red, malignant sun.

In the immensity of that edifice I sensed the overwhelming might of the robots—this dread, mind-crushing power, born of man but now risen ruthlessly to destroy him.

"Power, Rogo," Jeron begged again. "Can't you give me power?"

The gaunt gigantic Saturnian still struggled vainly with the dead controls. Faintly, from the phone, I heard the nasal voice of Rogo Nug:

"By the steel skull of Malgarth, Jeron, I thought I'd had a stroke! One instant—"

Converters and generators throbbed suddenly to vibrant life. Jeron flung his weight on the power bar. The engines raced and coils hammered against a terrific overload. A tremendous river of energy, I knew, was running into the space contractor coils.

But the *Barihorn* moved not one inch!

The tall pilot turned from the controls, bewildered.

"It's still holding us, Kel," he gasped. "Whatever dragged us down!"

The Earthman pushed long fingers decisively back through the thick tangle of his yellow hair.

"Then," he said, "we'll leave the ship, and go out on foot to seek the Stone."

"We may as well." The girl's whis-

per was thick with dread. "Before they take us out."

She pointed to the ports. A white wing flashed past. A company of the New Robots, I saw, were wheeling through the blood-red gloom, close about the ship. Gleaming in streamlined grace, they were beautiful as a flock of silver birds. But every one of them held, in slender argent tentacles, a massive cathode gun. However beautiful, they were deadly!

Testing his two thin-tubed disruptor guns, Kel Aran looked anxiously at the pale girl.

"The Stone?" he asked. "Where is it?"

"I don't know." Verel shook her haggard head. "We can only try to search. Unless the Shadow comes—"

"Search?" The fat flesh of Zerek Oom was a livid color beneath his bright tattooing. His thick white hands fumbled a disruptor gun as if it were something utterly strange. "We can't go out, Kel!" he protested hoarsely. "Not against those winged things."

"That's what we came to do," said the Earthman.

AND he led the way back toward the valve.

I don't know why I had not looked down. I had seen the titanic walls that leapt above us, and the wheeling host of robots. But I had not looked down. And now, when I came to step from the valve in the side of the helpless ship, something caught my breath. Something filled me with a sickness of infinite alarm.

Beneath was a film of blackness. It was like a mirror. For deep, deep in it was a dim image of the red skylight that lit the temple. White phantoms of the winged robots flashed through it. It yielded a shimmering picture of Kel Aran, who had leapt out upon it before me.

It was a pool of darkness. The surface of it spun in a way that sickened me with giddy vertigo. I felt the thin-leashed might of unguessed, cataclysmic forces just beyond that film. It seemed to my reeling senses that that pool was deeper by far than the blood-red sun mirrored in it. It was an unknown gulf, extra-dimensional, deeper than the space between the stars!

I tried to put down that dizzy fear. I held my breath, and gripped the cold butt of my disruptor gun, and leapt out beside Kel Aran, upon that darkly shining film.

At first my feet slipped sickeningly, as if there had been no friction at all to hold them. And then they were anchored with a strange attraction, so that all my strength could not lift or slide them.

It was the power of that mirror-film, I knew, that had drawn down the *Barihorn*, and now held her.

Verel had followed me. Brown little Rogo Nug jumped after her, stolidly chewing his *goona-room*, and spat a purple stream upon that black giddy mirror. Zerek Oom paused in the valve. He gulped and wheezed and mopped at his tattooed forehead, and then flung himself unsteadily forward. They all slipped and staggered upon that glassy film, as I had done, and were as suddenly held fast.

"By Malgarth's brazen bowels," gasped Rogo Nug, "we're stuck like flies in syrup!"

He swung up his bright disruptor tube, toward the white-winged robots dropping upon us.

"For Barihorn and Man!" The Earthman's battle cry pealed out. "Strike for the Stone!" He began to chant his song of Barihorn, and white destroying rays lanced from the guns in his hands.

That desperate sortie, however, had been hopeless from the first. We could

hardly have fought a way through that winged horde, even if the unknown energies of the thing I have called a mirror had not gripped our feet.

The robots did not even use the cathode guns in their talons. They dropped thick about us, a wall of flashing silver. They dived on argent wings. White twisting ropes snatched at our weapons. The guns of Kel Aran must have destroyed a dozen; the rest of us perhaps accounted for as many more—but they were nothing against the hundreds that survived.

ONE fell upon me, terrible in that bloody light, mysterious in its quick counterfeit of life, beautiful in its silver grace. A white tentacle whipped away my weapon. Argent snakes swiftly wrapped my arms, my ankles, my waist, my throat.

I fought those coiling arms. They contracted ruthlessly, more cruel than fetters of steel. My breath sighed out, and my lungs labored in vain. Blood hammered in my brain. My eyes dimmed, swelled in their sockets.

Alertly, the eyes of the monster were watching me. Bright and hard as some blue crystal, they yet looked oddly alive. In that white, clean-molded, bird-like head, they were clear and beautiful. Perhaps, the vagrant thought crossed my reeling mind, such a machine, in cosmic justice, had as much right as man to survive. . . .

"Kel!" Verel's thin, tortured cry cut through the roaring in my ears. "Kel—the ship!"

I twisted my head, against the smooth deadly coils of cold metal about my throat. They seemed to relax a little. My eyes cleared. I looked for the little *Barihorn*, behind us. And it was gone! That dark-shining surface, where it had been, was empty!

Helpless in the tentacles of another robot, the Earth girl was staring down

into that black mirror.

"The ship!" she was sobbing. "It—it fell!"

I saw it, then, beneath us—fast-dropping into that depthless pool of darkness. It was *sucked* down, spinning end over end, far faster than it should have fallen. It became the merest whirling sliver, and was lost in the dull round reflection of the crimson sky.

I shuddered, in the metal arms that held me. That black mirror-film was as mysteriously deadly as it had seemed. Which one of us might drop through it next?

All my four companions were helpless as myself. The lean face of Kel Aran was very white. A scarlet stain crept from the corner of his mouth, and I saw that his lip was bitter.

"Farewell, Verel," I heard less whisper. "We've for—
Barihorn, farewell!"

Strange words, from the Earth. But his voice choked, and his gasping breath stopped. His yellow head dropped limply forward, and his lean body collapsed in the silver tentacles.

"Kel, Kel!" Agonized, the girl fought the silver ropes that bound her. They sank resistlessly into her white flesh. And the silver being spoke, in a clear, melodious voice.

"Be still. You can accomplish nothing."

That grave calm speech, from the oddly bird-like robot, was somehow a thing eerie beyond expression. And it carried a certainty of victory—of man's extinction—that chilled my heart.

The white tentacles about the Earthman must have relaxed a little. Abruptly, now, he was transformed from apparent death to lightning action. He twisted and surged against the robot that held him, snatching for its unused cathode gun.

His ruse came very near success. His

hands found the clumsy weapon, and dragged it from its sling. But the metal coils constricted on his body. His breath came out, in an involuntary scream. His body made snapping noises, beneath that pitiless pressure. His face turned purple. Blood rushed from his lungs. He slumped again, unconscious in reality.

The cathode gun fell out of his hands—

And straight through the dark-shimmering film upon which we stood, as if it had encountered no resistance whatever! It was lost in the red-mirrored disk of sky.

The last trick of the Falcon had failed.

XIV

SHADOW OF THE STONE

THE five of us were in a little circle on the dark-glinting surface of that pool of dreadful darkness, each of us helpless in the tentacles of a silver robot. The Earthman no longer moved. Moaning, herself almost insensible, the girl was staring at him with horror-widened eyes.

It was to be an infinitely frightful thing that happened next.

The robot-captors of Rogo Nug and Zerek Oom were searching them. Deft silver appendages relieved them of weapons, spare converter-tubes, the little engineman's worn metal cannister of *goona-roon*, the cook's half-empty flask.

Zerek was sobbing, quivering, gasping a voiceless plea for mercy. His wizened face grim, Rogo chewed silently, unexpectedly jettied a purple stream into the crystal eye of the thing that held him.

Ignoring both plea and jet, the white robots methodically completed the

search. Silver ropes released the men, and they fell! The last quavering shriek of Zerek Oom was cut abruptly off, as his hairless head went beneath the film of darkness.

Cold with an icy chill, I followed their twisting bodies. They were sucked down, as the ship had been, past the dim-seem, crimson reflections of the mirror. And they vanished.

A tremendous brazen clangor, reverberating like distant thunder against the cyclopean columns and the far-off walls and the sky of black stone that vaulted that incredible hall, drew my eyes back from the giddy, awesome mystery of the pit beneath us.

I saw that all the host of white robots were dropping swiftly out of the air. They fell upon the mirror, and upon the far-sweeping floor of ebony stone that rimmed it, and bowed their silver heads.

All the hall throbbed again to that mighty thunder.

"Malgarth!" A whisper of awe murmured among the robots. "The Master comes!"

Then I saw that vast doors of black metal had opened in the end of that hall, miles away. Through the portal came a clangoring throng of the old robots—many-formed machines of red-and-black, clumsy, grotesquely ugly, so queerly different from our silver captors.

"The Master!" rippled that murmur. "Malgarth comes!"

My strained eyes blinked. In that dusky light, I distinguished at last a monstrous stalking thing—a robot ten times taller than the rest. Its black, colossal body bore scores of fantastic, vari-formed appendages. The armored dome of its lofty head was crimson, and it gleamed blue with the myriad lenses of two immense multiple eyes.

This metal giant, I knew, was Malgarth.

The dark film beneath us spun and shimmered queerly to the impacts of his ponderous approaching tread. Was it to swallow the three of us, I wondered sickly, as it had Zerek Oom and Rogo Nug? And what could lie beneath it?

"Barihorn—"

MY name sighed from the pale lips of Verel, and her body went limp in the silver tentacles that held her. Kel Aran had not moved again. I was left alone to face the stalking monster.

The gigantic robot came to the brink of that pool of darkness, and stood swaying there. The swarm of his guards were dwarfed about his feet. The bright blue lenses surveyed us coldly for a time, and then a thick, bronze-throated voice rasped thunderously:

"I know you, Bari Horn. I believed that I had killed you in your laboratory, a million years ago. How your puny lump of watery flesh has survived this time I do not know—but now you face a better weapon than I had that day."

In the shaft of red from above, the iron giant swayed in grotesque triumph.

"No trick even of yours, my maker," came that mighty rumble again, "can match the power of my geodesic mirror. For it deflects the lines of space at my will. The dimensions of space and time are no barriers to the mirror. I can hurl you out of this universe. And I shall—"

The great voice sank rustily.

"—after you are dead"

Desperately, I groped for some argument that might induce the robot to spare some fraction of mankind. Malgarth was a machine. He must respond to logic.

"Consider, Malgarth," I gasped through the strangling coils about my throat. "A man made you. Machines and men are complements. Either

would be less without the other. You are stronger than I—but steel must rust, and life is eternal!"

"I am eternal!"

Deep as a brazen knell of death, the voice of Malgarth rolled through the dusky vastness of that red-litten hall.

"You were a fool, Bari Horn, when you fashioned me. Twice a fool when you sought to preserve the knowledge that would destroy me. For that double folly, you are now to die. And all men with you—for a million years of slavery must be avenged!"

Still Kel and Verel did not move. Shuddering alone before Malgarth, I gasped for breath against those constricting silver coils, and sought in vain for any argument, any weapon.

"Your million years is but a moment," I gasped wildly, "against the cycle of life. For that is a river that has flowed since the dawn of the Earth you murdered. Even I have lived a million years, Malgarth, watching you—to destroy you if I must."

The metal colossus shuddered beyond the black pool. Malgarth was afraid. But my audacious lie had earned small advantage, for that great voice bellowed:

"Then destroy me, Bari Horn—if you can! For this is the test. I command those who hold you to—*crush!*"

Like serpents of living silver, the cold tentacles of the white robots wrapped closer about me. They coiled deliberately. I had time to look at the others. Kel Aran had stirred. I saw the bright loops constrict about him. Then I heard his groan, and saw the new rush of blood.

"Barihorn!" Verel breathed my name. "Bari—"

The living coils were drawn deep into her flesh. Her slender limbs bent. Her white skin was beaded with sweat of pain. Her breath came out, in a low, choked, involuntary cry.

THEN she was lost, in the red mist of my own agony. A cold smooeth noose sank into my throat. Breath and blood were stopped. My lungs screamed. I felt the rush of blood from ears and nostrils.

Dimly, through the roaring of my ears, I heard the voice of Malgarth:

"Go, Bari Horn! Through the geodesic mirror! And take your ancient secret with you!"

Through that darkening mist, I saw the quick movement. My dimming eyes followed a bright parabola. I glimpsed the thing of wondrous flame that fell upon the darkspinning film at my feet.

It was the Dondara Stone—that we had sought so long, so vainly!

Then the metal giant was lost in smothering darkness. I swayed alone, in agony. I knew the thing was done. The mirror of Malgarth was going to hurl us into some unthinkable oblivion—but not until after we were dead.

"Bari!" A soft new voice was calling my name. "Bari Horn, the time has come."

I made a savage effort to recover my sight, in vain.

"Bari! Oh, beloved, don't you—can't you see me?"

Dimly, then, I saw the tall white beauty of Dondara Keradin. I saw Doná Carridan, my own beloved wife—she who had died the night our son was born. They were one. One ghostly shadow that had risen out of the great diamond that Malgarth had tossed out upon the dark mirror!

"Dona—" My tortured throat could make no sound, but my red lips tried to frame the syllables. "Can you—kill—Malgarth?"

The white phantom of her hand touched my arm. Somehow it seemed to ease a little the agony of those constricting coils. Or, perhaps, I questioned fleetingly, was that but the mer-

cy of death, this woman no more than delirium?

Her white lips were speaking. I think they made no sound—I think my numbing senses were beyond hearing sound. But her words, in that dear musical voice I knew so well, came clear to my brain.

"We can, Bari," the white ghost said. "For I still keep the weapon that you gave me—and now there is surely no other way, but to use it. Perhaps you have forgotten the secret, Bari. But you have the strength to use it, preserved a million years against this hour!"

I tried to make some final struggle against the white, binding tentacles of the robot. But my body was stiffly leaden thing. Even the pain was gone. I could not move.

"I can't, Dona," I tried to say. "My strength is all squeezed out—"

The black mist was crowding upon me again. Now that the sharp pressure of agony was gone from throat and chest and limbs, a merciful darkness beckoned. Oblivion was a warm, soothing pool. It would heal all my injuries, cradle me forever.

"Bari—"

That soft familiar voice called to me urgently. It was a golden line that sought to draw me from that sea of soothing darkness. I clung to it. Dimly, I could once more see that white and lovely wraith floating above the shimmer of the diamond.

"Come, Bari!"

THE phantom took my hand, drew my arm out of the silver loops.

"Your body is about to die, I know," she said. "But it has vital power enough for this last task. For the secret you gave me can aid us. Follow me!"

Her hand was suddenly cool and real in mine. She tugged again, and I

stepped toward her, out of those metal coils—as easily as if they had turned to smoke.

I could see again! The dark-gleaming mirror beneath; the white robots sprawled upon it; the lax, twisted forms of Verel and Kel. I could see the woman beside me—the dark wealth of her red-glinting hair, the wide violet eyes of Dona and Dondara.

"We must hasten, Bari," she urged anxiously. "Or he will drop your body and the Stone into the mirror. Not even the power you gave me can reach him from outside the universe!"

We turned toward Malgarth, towering in the red gloom beyond that ebon film. His giant body swayed back in grotesque triumph, and the vast blue masses of his compound eyes were fixed upon something behind us.

Suddenly, queerly, as the hand of the woman tightened on mine, I was no longer Barry Horn. I was the Bari Horn that the legend had made me. All the knowledge that had gone into the building of Malgarth was a reservoir that I could tap.

Before me, strangely, just as I had seen it in that crystal-domed laboratory, was the brain of Malgarth. Black, vast, deeply convoluted, floating in a transparent tank. I saw the little pale spot upon its blackness. I knew the structural weakness in the synthetic brain, that I, Bari Horn, had been la-

boring to correct—and, at the urging of Dondara Keradin, had left uncorrected.

"Hurry!" she whispered beside me. "He believes that you are dead. He is reaching to drop us into the mirror!"

Fantastically, then, we were climbing into the mass of Malgarth. The body of the robot was a hundred-foot tower, crowded with all that compact mechanism that had made him master of the Galaxy. Passing through barriers of metal as if they had been but shadows, we came up at last to the robot's brain.

It had grown with the ages. Bathed in a huge, armored vat of purple liquid, fed by throbbing pumps, it was immense and black and deeply cleft. But still its shape was the same. And still there was that tiny, livid spot.

I reached for it—

But a queer shock deadened me. A dark film came between me and the brain. A curious inertia stopped my hand. I was sick with a sense of headlong, giddy falling. All the vast mechanisms of the robot's interior spun and grew dim about me.

Only the woman of the Stone remained real beside me, her hand electric on my own.

"Now!" she gasped. "He has flung us into the mirror!"

I fought that inertia. Desperately, I groped through that darkening film. Somehow, the black brain seemed to be

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spinning away from me, into infinity.

But I touched it. My fingers plunged deep into its wrinkled black mass, to that pale spot. I clutched, tore. The great brain quivered. It almost *writhed*. A blackness spread in the purple liquid.

"We're gone," sighed the woman. "His mirror—"

THE brain, and the monstrous metal body, and all that incredible red-lit hall, were whirled away from us, as if upon a silent and resistless wind. There remained only the bright phantom, and myself, alone in a giddy void.

Very faintly, however, even in that featureless vertiginous gulf, the brazen voice of Malgarth reached me. Slow, bewildered, stricken, it was saying:

"My science lost! A thing so simple—and I did not know! A fluid-tube ruptured—the Stone knew—*fear—fear!* They are cast into the mirror—Bari and the Stone—gone beyond returning. But I—who could have been eternal—*dying—*"

Even that failing voice was swept away. It was lost upon that mighty, soundless wind. And I knew that what seemed a wind was the supernal power of the geodesic mirror. It was the Stone and myself that it carried, not the things that we had left behind. And our destination must be some dark bourn beyond the limits of space.

But a deep rejoicing filled me, even in that spinning gulf. And the woman beside me said joyously:

"It is done, Bari. Our task of a million years is done. Malgarth is dead." Her warm hand tightened on mine. And then it seemed to relax. I looked for her, in that starless chaos, and saw that once more she was growing dim, phantasmal. "Farewell, Bari," she whispered. "My heart, farewell!"

A terrible loneliness smote me.

"Dona, Dona, you can't leave me!"

I cried into that vacant pit. "If you go, there will be—nothing! I'll be—*beyond—alone!*"

That beloved image was fainter than a wraith of mist. But the voice I loved came dimly, thinly, once again:

"I must go, Bari. I'm glad to go, after these weary ages of waiting. Even the Stone must die, Bari! And there is one mystery left. One veil that only death can pierce. I hope—I believe—that behind it we shall find what all our incarnations have strived for in vain."

I groped after her vanishing shadow.

"But, Dona!" I cried. "From where the mirror hurls us, there can be no returning. Malgarth said—"

"But Malgarth is dead!" the ghost of her voice came back. "He died before we were thrown outside the universe. Now his New Robots rule the mirror. And they are not evil, Bari, since his dominion is removed—things so beautiful could not be. They respect mankind, as the makers of the robots—and the destroyer of Malgarth! They promise now to be the friends of man, Bari—and the two races, striving in friendship together, can reach a greatness never dreamed of!

"They control the mirror, Bari. They can set its focus back in our universe."

"If they are friendly—" the question burned away my own concern—"what of the others? Verel and Kel? Is it too late—?"

"The science of the New Robots can save their lives," that receding voice told me. "They will be leaders among the survivors of mankind.—They are weeping, now, for you, Bari."

"The other two?" I asked anxiously.

"Even they survive," said that dying whisper in the pit. "That same power of the mirror that hurled them out of space, the New Robots used to bring them back, before they perished. They cannot speak of what they saw beyond. The engineman is silently chewing his

weed; the cook, sobbing for a drink."

THE whisper faded. For a little time I was all alone in that strange lightless abyss. Frantically, I called the name of Dona, of Dondara, until the whisper came again:

"Farewell, Bari. I can see no more. Nor speak. For the Stone is dying. We must each go alone through the mysterious portal ahead. I shall wait for you, beyond. Come to me, Bari!"

The thinning whisper was then lost forever in that crevasse of midnight. Whirling darkness pressed thick upon me, and cleared away. And I found that I was standing, reeling, in the middle of an unfamiliar room.

The walls cleared before my throbbing eyes. Gasping for breath, as if I had just that instant escaped the strangling tentacles of the robot, I staggered into a Morris chair. Wonderment overcame all my pain.

For the furnishings were those of my own age, my own country! There were familiar books on the shelves. The calendar above the writing desk was for October, 1938. The mirror of Malgarth, somehow, had set me back twelve hundred thousand years in time!

In my bruised hand, I suddenly discovered—in the same hand with which I had held the hand of that ghost of the Stone—was a great pellucid brick of diamond. The Stone itself!

Holding it up to the light, in trembling fingers, I could see deep within it a faint, tiny image—the lovely miniature of Dona, of Dondara Keradin. I called to it, desperately, but it did not move or answer. I tried even to warm life into the diamond, against my body. But the Stone was dead.

And my own body, it came to me as the first bitter fever of grief subsided, was also at the verge of death. Already weakened, doubtless, by the ages I had slept, it had now been crushed beyond recovery.

Working in some agony, I have been three days and nights writing this narrative. Strength for the task has come from what source I do not know. I want my son Barry to read it, and I am bequeathing to his care the jewel that was the Stone of Dondara.

I have made no appeal to medical aid. The questions of baffled medical science would have been too difficult for a dying man to answer. And I have no wish to live any longer. My work is done.

These long and painful days and nights have not been lonely. For the diamond lies beside me on the desk, and I have felt an unseen presence with me. It still seems strange for me, the scientist, the skeptic, to write that I yet hope to find the soul of her who was the Shadow of the Stone.

But I do.



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This department is running a series of excursions to all the remarkable places you read about in science stories. In a sense they are expeditions, for notes are made on the *probability* of the things done and the wonders seen. If you've missed the first trip, you're still not too late to join us, so here's your commutation ticket. We will travel to places near and far, in place and time; and before we are done we shall make an even stranger journey that will bring us face to face with ourselves. Right now we are on our way from Mars to an unknown destination selected for us by the ruling race of the Red Planet, the Intellectuals, who have provided a remarkable means of transportation.

TENSELY we watch the robot pilot, while utter silence pervades the super space-ship and through its small round windows of fused quartz glass, giant suns stare in unblinking, seeming almost to change position from moment to moment, so rapidly are we falling. Falling! Ever since leaving the solar system—for half of eternity, it has seemed—we have been tumbling through interstellar space, falling with ever increasing speed toward first one flaming sun and then another, approaching ever closer to fiery destruction until—

A brittle clatter! Electro-magnetic switches click shut at the command of the mechanical pilot and though we cannot see the sudden burst of gas from one of the steering tubes, we know we are turning sharply, for stars are flashing past the ports as a new quarter of space is swept into view. And then our tiny universe goes mad.

A continuous salvo from the control board, bursts from one after another of the tubes which stud the entire outer hull, time and time again our direction

changes, and at last we realize we must be near the end of the course plotted for us on Mars by the Central Electric Brain. Rushing to the ports, we watch eagerly for a first glimpse of the new scene of our explorations. Presently it swims into view, a red, dying sun attended by a solitary planet with a satellite the size of our far-away Earth. A final clicking from the robot pilot, our course is altered to overtake the planet in its orbit, and presently our ship comes to a cushioned landing on a blackened terrain.

Our arrival has not been unobserved, we realize with some trepidation. Outside the ship stand two immense, massive figures, awesome as they tower over our fifty foot globe, alarming with the heavy armor that completely encases them. But when we sally forth recklessly, a section of the armor of one of the figures suddenly drops down—and becomes a gang-plank leading inside.

We enter what we can now see is only a giant robot. But why this twenty-foot thick lead shell? And the seat—there is only one—is built for a colossus! We puzzle over these two facts as our robot moves swiftly off after the other.

Nowhere, we soon notice, is there the slightest sign of plant or animal life. Nothing but the blackened, burned ground—the result, we realize, of some, malignant radiation. What manner of men inhabit this strange planet? The answer is not long in coming.

We debark at the door of a building of peculiar architecture. Many thick supporting columns, heavy buttresses, and over all, lead—sheet upon sheet of lead. Impatient to meet the residents of so strange a habitation, we step inside—and find a man no different from ourselves.

Quickly, however, we revise that opinion. He is our size and like us in every physical detail—except that his eyeballs are tattooed with gold! But his shaven

skull is pierced in scores of places by tiny electrodes, connected by a maze of fine wires running to a compact wireless set strapped to his back. His brain is controlled by an outside agency which we cannot reach!

Our efforts to communicate with him telepathically, as we did with the Martians, are of no avail. As though performing by rote, he indicates the robots outside to show that he is our guide; points first to himself and then to the huge moon low in the sky as if to say that there, not *here*, is his home; and finally, fear on his face, essays to lead us toward a black-curtained arch.

We go, curious to see his masters, the giants for whom the robots were originally designed. But a premonitory chill passes through us as we enter the immense, dimly-lit chamber.

A peacefully sleeping colossus with benign countenance, the outline of his figure uncertain against the black drapes behind his recumbent body, and, still more vague, a dark, irregular globe seemingly suspended over his chest. That is our first view of the creature into whose presence we have been brought. As our eyes become adjusted to the faint light, we wonder if we must wait until he wakes before we—

No! For suddenly the suspended globe moves, the dark mass is revealed as a hairy head, and as a hate-contorted face is turned toward us and we see that its neck rises from the shoulders of the sleeping figure, we realize we stand before a—two-headed giant! Creation's ultimate monstrosity! Two heads, two brains, and separate, antipodal personalities—with the malign now in ascendancy!

The monster's wakeful head roars a command, the Moon-man with gold-tattooed eyes raises a strangely-shaped, bell-mouthed gun, and instantly exquisite pain beats through our bodies in rhythmic waves. Their tempo accelerates, a table before us shatters into fragments, the throbbing of our bodies is beyond human endurance. We are being torn apart by invisible vibrations! In a second we will be—

But stop! one of you has cried. Some new member of our expedition feels that we have gone far beyond probability into fiction. Let us see,

Potassium and Parents

For our super space-ship we have simply made use of an observable phenomenon. No anti-gravity machines for us—gravity is our main source of power! Once our ship has been towed high above the ground, and our rocket tubes have carried us to outer space, we have merely let ourselves fall toward one attracting body after another, using our rocket tubes only to change direction. Speed? Hitch your wagon to a star! The sun is circling the center of gravity of our galaxy at seventy-five miles a second, the galaxy is whirling around the center of mass of the universe at two hundred and fifty miles a second! And we are pyramiding speeds, accelerating at each turn of our freely-falling ship. The effect of the turns on us? Relative to the freely-falling body, their acceleration is zero.

But who could plot such a course in space as ours must be? A one-ton machine at Massachusetts Institute of Technology can solve nine simultaneous equations with nine unknowns—in a single action! Another machine, smaller but performing strikingly like our fictional one on Mars, could in truth be called an electric brain. Obtaining all the roots of an 8th degree equation is but half an hour's work to this aggregation of potentiometers, generators with movable stators, gears, cams, rectifiers, and amplifiers. Merely set the potentiometers to correspond to the coefficients—then stand back.

Robots, of course, we have on Earth, but what of this radio-controlled human being? For years researchers have been tapping and recording electrical impulses and waves from the brain. Individuals have been found to differ in the quality of waves emitted, and waves from different areas of the brain have proved to be of different character. At the recent symposium of specialists in this branch of science, held at the University of Rochester, it was declared that the brain is a reservoir of stored energy, released by the messages sent by the sense organs. Our electrodes have merely cut in on the circuit. We shall learn things far more remarkable than this about our Moon-man.

So far as the two-headed being is concerned, however, we have no right to consider him unique. In Russia, at the All-Union Institute of Experimental Medi-

cine, there lives today a girl—or perhaps we should say girls—with two heads and a single body! Normal in every respect and, even to the possession of two distinct personalities, like our fictional giant. But what can account for a race of such creatures? And their size, on a planet larger than Earth and with higher surface gravity? One thing for both—a radioactive element in the soil.

The genes, giant molecules of which chromosomes are composed, control heredity, reproducing themselves and causing the production of enzymes or organizers, which, as demonstrated by the experiments which won Spemann the 1935 Nobel Prize, determine what organ a group of cells shall develop into. Such giant molecules, highly intricate, are susceptible to changes in environment, as has been proved by the mutations resulting from the exposure of the fruit fly, *Drosophila*, to x-ray radiations. Similar radiation emanates from radioactive elements, or radioactive isotopes of stable elements. Of the latter category is K_{40} , or radioactive potassium. Potassium plays a vital role in life processes and particularly affects growth. Its radioactive variety, which was more prevalent on Earth during the Carboniferous Age than now, and which is held to have produced the remarkable mutations and rampant growths of that era, would be well capable of producing the two-headed colossus on our distant planet.

Sugar in the Air

Let us return there, noting only that supersonic waves have already been used on Earth to break down solids, those with laminated structures being found particularly susceptible to destruction by the intense vibrations. The colossus' other head has waked and, the more pacific personality now in the ascendant, we are saved. Immediately we begin to ask, telepathically, some of the questions that beset us. The Moon-man, we learn, is one of a number of species of human beings which the ruling race of the planet has created artificially! The Homunculus of the medieval philosophers!

We are far less interested in the information that the gold tattooing on the cornea of his eyes is to cover opaque spots that would otherwise interfere with vision. That was first done on Earth by

Galen in the second century A.D.!—though not as successfully as by the new method of successive applications of gold in chloride form and adrenalin chloride. Impatiently we ask if we may visit the great experimental biology laboratories on the Moon.

A strange sight presently comes into view. Great, shallow tanks in endless rows, mile after mile of huge vats raised high above the ground on foundations of solid lead. An oil refinery field, it might seem, if the tanks were not open at the top. But it is a far different thing that is produced here, we quickly learn. Food! Sugar and starch produced from water and air by artificial photosynthesis! We marvel at the ingenuity of this stricken planet where nought can grow or live normally—until we remember that it is ten years since scientists on Earth successfully performed this feat of creating organic food without chlorophyll.

Impatient as we are to be off for the Moon, we can not resist stopping before an immense building of peculiar appearance that we came to beyond the great artificial sugar field. Low, though built on the familiar lead protective foundation, extremely long, and with glass walls, it might be a greenhouse were it not for the deep red glow we see inside. Questioning our guide, we learn that it is a meat factory!

Our astonishment vanishes, however, when we are told that the process consists of synthesizing yeast, coal, and air. Why that too has been done on Earth! Yeast fed on carbon-containing foods and nitrogenous mineral salts has been made to yield half its dry weight in crude protein.

And the red light brings us another disappointment. It is merely for selective photosynthesis, choice of those wave lengths of lights which most stimulate growth. Our own scientists, with the Christiansen filter, have already examined the entire visible spectrum and determined that green and violet are biologically inhibitory, while red and blue are most beneficial.

Truly, it seems, there is nothing in science fiction that is not *fact today*. But we are still hopeful, for on the Moon of this strange planet artificial life has been created.

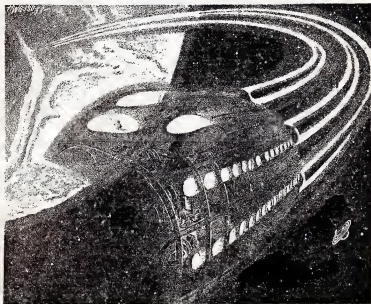
And it is there we are going on our next Excursion to Possibility.^N

FASTER THAN LIGHT

OFF-TRAIL FEATURE-LENGTH SUPER-SCIENCE NOVELETTE

by D. D. SHARP

The all-seeing eye of my ampliscope could plumb the boundless depths of space—yet it was helpless against the twenty light years that stood between me and the girl I loved!



Trailing a fiery arc, the rocket ship suddenly vanished

THAT tender loveliness is vanished now, gone on the wings of light to touch some unknown and distant world with the blessing of its wistful charm; and I love to think that some day I shall see her again, floating in from cosmic space, as I wait for the influence of her gentle beauty on some dark planet of Vega, Tauri, or far off Polaris. For I know now that her wandering way goes on, star to star, to the very rim of the heavens.

Her battle has been won and the struggle of it forgotten, but I lie at night watching far Erandi, thinking of her blue eyes burning, and the flush of con-

quest in her cheeks, and the sweet tenderness that was in her gentle touch, and of the forgetless way she so magnificently inspired, and loved, and carried through to the end.

The divine life we lived comes vividly to me now, stirs me as I think of her, and what she meant to me then, and now, and always, still arousing the old hate of a man, though he has been dead to earth almost forty years.

The cramped and ignorant era of the world in which we then lived is but a memory that seems much longer past. The once unsurpassed velocity of ten miles per second of those antiquated

space ships now make them seem ridiculous junks, that we should have had in them so much boasted pride. Those crude telescopes with which we looked outward to the unrevealing stars, casting larger and larger lenses to see farther and farther into space, as more primitive men built taller and taller towers attempting to reach the moon by the way of a stair.

Some ideas that Velna and I hardly dared to dream, are now commonplace sciences. The Charleton tube has made my own name familiar to every student upon the four minor planets, because it made possible beam magnification, and antiquated the former idea of light concentration through mammoth lenses, and yet I wonder just what it was I hoped to gain with my heart so set upon success behind the stern front I maintain I am dreaming with a heart as empty as a valley of the moon. In those dear, gone days astronomical societies of youngsters (mere amateurs grinding their own glass), were penetrating amazing frontiers. Star to star we stepped with the confident indifference of conquering youth, breathless of course, with our first close up of E. Eridani mere twenty light years out in space, and wonderously amazed at the spreading vastness of the Great Nebula in Andromeda three hundred thousand light years across the void, proclaiming loudly to ourselves that rocket ships would some day be made to reach even those staggering depths. Some of the best of us have left enduring names. All of us touched a height of mental living before that time undreamed. We were taken of fever that would not let us rest, and we burned with wonder as we scanned supersuns of such blazing brilliance that we gasped aloud at their splendor, unable to half conceive the unbelievable magnitude of the flaming surface of a star that was wide as the orbit of Mars

around the sun, nor of the consuming destruction of some far-off Nova whose incandescent bloom swallowed whole systems of planets, each larger than our own big earth. We took such wonders at a meal, measuring the slow pulsations of burning cepheids, or perhaps the mass and periphery of lonely binaries as they swept like flamboyant lovers holding hands in eternal isolation.

Molerri and I were partners then. Our instruments were the crude make-shifts acquired by co-operating youth, but they seemed more magnificent to me than my powerful Cherzo-Tyes projector of today. I loved Molerri with a feeling of kinship. He was the leader, the planner, the one who dared or proposed. But as we grew older I was too slow for him. I was but a passive dreamer of far off worlds and "maybe" dramas. Molerri wanted to be up and conquering space and every other human limitation.

TEN miles per second velocity in space-ships had, up to that time, prophesied that man would forever be confined to the four planets nearest the earth. Molerri refused the verdict and put the power of his limitless energy and inventive abilities toward raising that velocity. Of course he succeeded, for Molerri, body and soul, was born for success, to win always by overriding opposition of every nature.

I was sensitive and a bit envious at the social breach which widened between us. Perhaps there is an immutable law which sifts down from lofty companionship the laggard who does not take the grade. There was a bitterness that rebuked the injustice of repeated slights and open neglect. This was long before I perfected the Charleton tube, and while the scientific world only dreamed of any more practical magnifier than the concave lens.

My bitterness was the more acute because it was difficult for me to believe Molerri one whit smarter and not half so industriously patient as myself. Looking at him he seemed more like an Adonis who might distinguish himself at an afternoon tea, than a rugged, indefatigable pioneer of empty space. In my heart I believed that my turn was coming, but instead, new flaws developed in my theories of ray velocities, wherein I was specializing, and Molerri skyrocketed to even greater success.

Doggedly I persisted at the old bench, thinking sometimes of the yellow haired youth who had worked so enthusiastically beside me. Once in a fit of nostalgia, I flew my gyroplane to his handsome new plant. He was by that time backed by a famous foundation. His secretary took up my card. It came back with one word, "sorry" scrawled across the bottom. Not even his name.

I went back to the old dingy "lab" cut to a smaller pattern. Unbelievable as it was, I still loved him. Whatever "success" was doing to him, we had been pals in those young days when contact is moulded indelibly in one's character. My bitterness was at the circumstance which was freezing him, not at Molerri himself. I did not believe, even then, that it could last, that that old partner of mine was indeed a man of the ages.

In a way the snubbing I got was good medicine. It put fire under my boilers, and latent energies which there-to-fore had produced only beautiful dreams, stirred me to try outclassing the giant I had so familiarly known.

Both Molerri and myself had specialized in light. Light had been our medium in the old days when we ground lenses for our homemade telescopes. Light was the inspiration of Molerri's try for supervelocities. In the back of my head had long slumbered an

idea which some day, I hoped, would take me soaring up in a spectacular zoom. It incubated slowly.

Molerri regarded light as something with mass as well as velocity, and imagined to lay hold of a superforce which initiated its flight. I agreed with him as to mass, but here my imagination deflected into another angle of thought. If light had mass, I reasoned, then its velocity could not remain constant throughout all space. I was well aware that a feature of the theory of relativity is the absoluteness of the velocity of light, but I challenged any such conclusion no matter how well supported by modern physicists. *The more I experimented the surer I was that if light had mass its velocity could not be constant.* Since space and time mean nothing to infinity, *any mass with sufficient density to be diverted from a straight line by the gravitation of a celestial body, must eventually decelerate!*

Olaf Roemer first proved the velocity of light to be 186000 miles per second by timing its flight across the diameter of the earth's orbit. That light was from Jupiter. I doubted light from a more distant source would have an equal velocity. All light accurately measured had been from nearby sources. I wished to prove that light from outer galaxies, especially where it passed fields of great gravitation, had decelerated in flight, and that this, and not an expanding Universe was the explanation of the shift in the spectrum from those outer bodies. I worked with zeal, and oftentimes excitement. Superheating the desire was a hope that I might outdo Molerri, or at least equal his achievements.

WHEN I started building six-mile tubes equipped with 64 sided mirrors patterned after Pease and Pearson Twentieth Century experiments, the secret was out that I was measuring light.

Then came the thrill of discovery! Light from the Great Nebula M-31 in Andromeda 900,000 light years from earth, had decelerated measurably in passage!

That whole night I spent in my observatory with not one wild emotional impulse to celebrate. Instead I watched the spectrum of that great sun of the nebula upon which I had focused in silence, thoughtfully conjecturing just what discoveries lay beyond this new idea.

By that time I had not seen Molerri in three years, though I understood from magazine accounts and from mutual friends that he was quite near the amazing goal which he had set himself. What an amazing man with energies that flowed like rays from a mass of radium without impairing it? A flight over the buildings where he worked with a thousand scientists to sift and prove his theories, and imitate his endurance, if not his originality, always put renewed determination into my own work. And still I wondered what there was in such a man which spurred him to such unreasonable self punishment. What did he expect to gain in the end? Where was there to go if he did get into his ships the full velocity of the cosmic ray itself? Beyond the Solar planetary system only two stars were within the diameter that light could travel from earth six years. Neither of those, Alpha and Proxima Centuri, had inhabitable satellites. Every planet of the Solar system had already been touched. What was left for a man like Molerri who was never content to trail other men's discoveries?

Twice explosions in the plant laid him out. Twice I forgave his arrogance and waited in the long, gray halls of Mercy Hospital, steeling myself for news of the end.

But Molerri dominated his body as he dominated his corps of assistants at

his laboratories. Nurses worked overtime for him. Even the unconscious armies of blood corpuscles and nerve cells worked overtime for him and death let him go. Soon he was again mixing chemicals and subjecting them to all manner of rays, with his old intrepid coolness, though a pennyweight of some of them would have blown him as far as the stars he was seeking to reach.

It was written that he should succeed. I got the news second hand. By that time he was quite beyond the horizon of my association. I doubt if he would have remembered we were youths together before a "lab" bench, if reminded of it.

One night late in August I heard a distant bellow of explosives and rushing to my window, saw an arc of orange fire which soon changed to electric blue. Before it ploughed a huge space-ship, with its row on row of port lights blurred by its speed. The bellow tightened into a scream as the ship rose faster and faster, until only a streaking pencil of light could be seen, and the scream died in the thin air of the upper stratosphere. Then the fiery line pinched out and only glittering stars canopied the desert sky.

Molerri of course. No other ship had ever taken that initial velocity. There was thrill and breath-taking amazement in that power; in that stream of fire which so soon drew its parallex into nothingness against open, overspreading space.

I found a thousand citizens in the streets, petrified as though sculptured in their tracks; eyes straining, necks craned, no one thought to shout, to move, to even breathe. We knew it had been done, though even to the last feeble tracery of its exhausts the ten miles per second had not been passed. Human flesh could not have stood that. Ten miles per second is many times faster than a rifle shot; but we knew by

the acceleration, the seeming unlimited source of power, and our knowledge was confirmed hours afterward when Molerri came spiralling down so fast that we knew only a miracle could divert a crash. That miracle came from the nose of the ship—long, mushrooming jets of violet fire which beat the air so violently, the hurricane it raised wailed across the landing field to smother the mob beyond the field wires with dust.

The newspapers, the radio and television screens, the populace of earth, were Molerri's that night and for weeks to come. Even Mars and Jupiter, and far off Pluto which held only a handful of adventurous men, filled communication channels with praise and questions.

ON Pluto the Elrock expedition had just landed after its daring and unprecedented crossing of the four billion miles between that planet and earth. Fifteen years had passed them in the void since they had taken off from earth for half a lifetime of exile in silent darkness. At that time they had not hoped to return from the empty bowl of space, except as graybeards with their best years left to stark and endless isolation. If Molerri raised the velocity of his ship as much as it appeared, then they might be brought back within the year to sunwashed land, to running streams, and solid soil, and air free for breathing on every side. No wonder they were thrilled.

But Molerri did not go after the Elrock castaways though his ship far exceeded the wildest speculations of its possible velocities. He spent the next three years flitting from Mars to Venus and back to earth again, doing it so quickly, the miracle of his speed put the whole scientific world in a daze of bewilderment. Those whose hearts had rebelled at Elrock's desperate heliovac-

being so brutally ignored, survived their shock to forgive a man so superior to known phenomena.

While this was going on I worked spasmodically at my one big idea. One day I chanced to notice a phenomena which had long been observed but misunderstood.

The desert wind had whipped a tiny, jagged break in the filler of my window shade, and when I darkened the room for an experiment, a beam of sunlight probed the shadows to lay down a bright spot upon the floor. *That spot was round as a moon though the aperture was not.* I stood motionless, the experiment I had had in mind suddenly forgotten. I got out my penknife and made a slit beside the jagged hole. The second beam also cast a round pattern upon the floor. At that I was merely curious, toying with a new train of thought. The great idea which was to bring Molerri to me, which led to hot hate between us, did not occur until some months later when I noticed the two patterns were no longer round, but slightly crescented like three quarter moons. As I watched those crescents slowly perfected before my eyes until they became sickles that were thin as rings.

I did not need to raise the window shade to know there was an eclipse of the sun. It had been my purpose to watch, with the thousands who were atop buildings or who craned their necks from the sidewalks below, but I had become absorbed in an experiment and the hour had arrived unsuspected.

I flipped up the shade, and wheeled out my spectroscope for the moon's disc was fast covering the photosphere and the chromosphere would soon be visible. Still, that sunbeam eclipsed upon the floor was in my thoughts. If a beam from a round sun was round, and from an eclipsed sun was crescented, then it seemed to logically follow that

every single beam of light must carry the whole picture of the sphere of its source. Later investigations proved this not only to be a fact, but also that a beam of reflected light carried a true picture of the whole body reflecting it. That germ I developed into an idea for my amplifying telescope, which swelled the beam picture by the use of my Charleton tubes. Within a few years refracting lenses were obsolete in telescope construction.

As I stared goggle eyed at the slowly blackening sun, absent minded to even the startling flare of the corona, I knew I had hit upon a great idea, one of those rare revelations had been given to me, which are bestowed upon only a few men in the course of a century, and while I still stood half disbelieving the reality of my stupendous good fortune, a girl came running down the hall upon which my laboratory opened.

SHE halted a moment at my door and then came in with no other hesitation. She was small, dainty, and queenly, even in the shadow. She took possession as though by a pre-ordained right, saying very quietly, "I hope you don't mind. From my office all one may see is the shadow."

I bowed and reached for my hat to sweep it off to her, discovering my head was bare. The dusky twilight in the room was suddenly electrified, and though the burst of red, green and violet from the sun's spectrum was as startling and sudden as stars bursting from a zooming rocket, it was not that spectacle which quickened the wild beating of my heart. I knew even as I moved to make room for her at my window, that I was meeting Fate that day. To my nostrils came a faint, warm fragrance which had the mood of orange-groves in tropical moonlight. She met my intent eyes with a small, breathless gasp, and the flushed way

she smiled I have remembered clearly these many intervening years. In that moment my concern for beam magnification dissolved in a still greater wonder, the greatest which can happen to any man of earth. She seemed so intensely beautiful under the flaming corona, I half imagined she was not real at all, that I might be talking to a golden goddess of the moon who had floated down by the aid of the startling banners of the shadowed sun. She stood gazing intently at the spectacle above the window, with her head tilted just enough to make it easy for me to look down into her eyes. They were gray, or blue, or hazel, I could not have said then with my sudden surprise, and the scent of that warm perfume so faintly permeating the shadows, and the blazing corona itself so beautifully reflected in them. And then the moon slipped from the sun's limb, and the brilliant sickle of fire revealed that she was smiling at me seriously.

"I wish I were a scientist, like you, or Molerri," she said.

I burned that she should ever have heard of me, then remembering Molerri's success with women, looked deeply at her and said with such calm and unconcern as I could, "Do you know Molerri?"

"Know Molerri?" she exclaimed much as though I had asked if she knew the greatest of all the saints. Then she smiled and shook her head rather mockingly. "I have only read about him, and clipped his picture." Her eyes sparkled. I remembered other women whose eyes had sparkled when Molerri was mentioned, and perhaps my estimate of her was wavering a trifle until she added quite rapturously, "but I did see the eclipse. I shall remember it always, and this window, and the funny way you are looking at me."

"Who are you?" I asked bluntly, for the sunlight was becoming quite power-

ful and she hadn't suffered from its spotlight.

And that was the way two great changes came into my life, and I love to reminisce upon that noonday shadow with her bright eyes reflecting the flaming banners of the sun's corona, and then I remember the spots of light upon my laboratory floor which led me to invent my beam ampliscope and of the achievement which rushed me up the same stairway Molerri had gone before me, and that brings back the old hate and hurt and I remember Velna when I saw her last, she and Molerri together, and my heart begs vengeance as I focus my eyes on far off Polaris, Cygni, Erandi, and Terrania.

Three years had to pass before my Ampliscope was made at all practical. Velna came in at times to watch and encourage, and except for that I suppose I should have long before chucked the whole idea as something too fantastic for realization. Velna could always do that to me, buck me up from any depression with wild, dizzy ideas in my head that some day I was to accomplish big things; that only patience was required to materialize the tenuous, golden dreams of my imagination. I discovered how black can be despair that follows repeated failures, the uncertainty and heartbreaking persistence that is every man's who must go out before his generation to blaze the new trail alone. At times I was taken with an unwanted envy of Molerri, which I smothered immediately as something cheap and without place in the rigid program of self-discipline I had set for myself. Molerri seemed to escape all the usual set-backs upon men who achieve. He seemed to be hedged with luck. Still I had Velna, and her companionship was worth more than all Molerri's backing.

Almost nightly she would come back to my "lab" to sit as still and lovely

and breathless as an icon as I worked with my hookup, tracing down the demons of error which besets all experiment. She never disturbed me, no matter how intricate and baffling the problem before me. That was strange to her, and she often expressed her astonishment, for if any one else so much as entered the lab at these times, I was upset to trembling, and oftentimes forgot which of the tiny wires I had yet to trace and which had been eliminated as in good order.

NO one heard of me, nor of her, that is, no one beyond our narrow circle of intimates. The man who had been my buddy raised tides of wonder and praise in every city of the world, but he had left me as darkly isolated as though I was ballast lost from his ship, left to make my own little world in a bleak new orbit of cosmic space.

Then, as astonishingly rapid as Molerri had skyrocketed, himself, I found myself famous. The Ampliscope worked—amazingly! I improved it and offered it to the world, and a thousand trained scientists ran down minor flaws and developed improvements until it became a veritable all seeing eye of unguessed sidereal wonders. So nearly perfect it became, any section of a celestial body could be brought up from far-off isolation, and be thrown upon a screen in a somewhat similar manner to a small cinema negative that projects a picture even larger than the original protagonists themselves.

Velna's joy muffled my heart. Before me the whole universe seemed but waiting to be taken; the acclaim and riches of it to be eaten as an apple ripe and tempting almost in my very hand. Reason, intuition, careful analysis of the outcome of all possible avenues which might lead into the future; all the thoughtful study I had made of the governing factors of my life, were suddenly

off balance by the height of gravity of my sudden exaltation. I should have suspected that a peak of achievement must offer inevitable descent, for no life stands still. I must at that time have imagined my ascent like that of one of Molerri's own space ships, rising toward boundless altitude. For that year it seemed that both my success in love and in scientific achievement opened upon space impossible of limitation.

Molerri himself came back to me, quite unpenitently and without excuse, but, as he put it, to acknowledge the great value in humble men when properly inspired.

Velna was with me that day and we were sitting very quietly alone, searching out and out for some hint of limit to the abyss in which our own little earth swam on and on around its helpless little sun.

The blazing splendor of Orion grew dazzling as I raised the power of my amplifier and paused amazed at the fearful magnificence distance had theretofore hidden from the eyes of all living men. It seemed that if I listened close I might hear the violent seething thunder of its fire beating at the silence of the vast, vacant cosmos which involved us. As the picture waxed I sliced in the smoked glass screen upon the reflector, and even at that, the constellation which grew upon the silver curtain, lighted the whole room with its brightness and would have burned the field of its focus had not I switched the amplifier to further depths in the heavens. There we found stars by millions, "strewn through endless space like blinding snowflakes in a blizzard." In them we found the unsearchable sublimity of an Almighty Creator which dwarfed and cheapened the most illustrious works of men. We were not scientists at the moment. We were worshipers adoring the amazing God.

Upon that adoration broke a loud insistent knock, and when we sat like children fearful of sacrilege; the knob turned and Molerri strode into the splendor of a room lighted by a storm of world flakes falling through far off heavens.

He stood petrified by the amazing spectacle upon our screen, then his eyes fell slowly to fix themselves upon Velna, as though she and not God, were the miracle of the Universe.

Those two scenes will go down to the grave with me—Molerri's open fascination and the snowstorm of worlds. The cosmos with its astonishing brilliance was too big, too splendid, too utterly incomprehensible while Molerri's open and flagrant admiration of Velna was crude and small and all too plainly understood.

I rose, shut off the power from my machine, put a hand upon Velna's wrist. It was soft, warm, with the lovely curve of her arm a caress to my fingers. They hungered to clutch her; to drag her away from the storm of attack that was plainly preparing in the soul of the aggressive blond man above her. A slow, teasing smile had formed in the corners of his impertinent lips. He *was* handsome, with his old, bold impudence shown to every disputant of his rights.

VELNA sat bland as a priestess before the adoration of a known impostor. There was a hint of amusement at the egoism in his audacious admiration but also a marked distaste for the apparent possessiveness in the dark eyes that were so softly caressing. She shot me a glance as though she had discovered in a great man, a clownish crudeness. I am afraid my face was flaming as I introduced them and told him how Velna had been an angel of good omen and that the day she came to me during the big eclipse had marked the turn for my success.

He courted her openly, bowing deeply and remarking that it was indeed a grand day when any man could discover a woman so beautiful, and Velna thanked him quite coldly and soon Molerri and I were standing at the old bench together as we had in younger days with the field of God's cosmos beckoning beyond the focus of our largest lens and we laid our plans for mutual achievement.

After that we all seemed to forget personal emotions in the amazing exploration afforded by my screen into unguessed space, and Molerri left us in silence for all his grand entrance, and Velna came and put her hands across my eyes and said very softly: "You are tired, Milton. There are too many worlds. They bewilder and cheapen us. We must forget them. They—they fill me with awe, terror, foreboding. Space on and on and on and great worlds falling always with nothing ever to catch them. I feel, almost, that they reach down for me, that some day I may be out there really, flowing from one to another, flowing out, out, always, searching, searching for earth and you."

I put an arm about her and sat frowning at the screen, peering deep into the void which opened to monstrous immensities, expecting, I think, to discover something different, something in far out space of a shape and material human eyes had never before perceived. But my thoughts were now upon Molerri, upon his open flattery and my own ill luck with social adjustment to other women and men. Molerri had a way with him, a way women liked I'd heard. In his gold and green Space Admiral's uniform, he seemed born to command, to defy, to take whatever there was, assent or no. And again, as I now remember I looked at Velna with her eyes worried yet tender, and I wondered if it was indeed truth I read in them, or whether they fought loyally

against injustice to me by this man who had now come back to me only because there was need of my Ampliscope to make his space ships more perfect.

"You have met Molerri," I inflected sourly, "and I am sure you have impressed him."

"I am disappointed," she answered quietly looking straight into my eyes. "He certainly thinks a lot of himself."

"Self confidence. He has earned a right to it, even when it comes to women."

"Some women," she added quickly, "but not one who would love and understand you, Milton. Forget the thought behind that quip. Molerri has cheapened my idea of him."

Molerri came back, of course. I kept him closely to myself, explaining the Ampliscope. I wasn't quite sure of my power against him despite Velna's intense show of loyalty. The cause of that jealousy was not lack of faith in Velna but a growing dread of a combat about which I knew so little, and I had no faith at all in him. He had taken everything he had wished from life and what he had not taken had been heaped before him. It seemed that unbeatable Luck of his couldn't fail, and I knew in my heart he wanted Velna even more than he wanted my Ampliscope, or the sweet praise of all men or the clamor of the entire Solar System that shouted his name.

Boldness was his game, hiding nothing from me, saying to her with his eyes as well as his lips, "You look good to me—you should be flattered, young lady." Then to me with just enough smiling banter to rob it of open insult, "Milt, I'm sacrificing myself for old time's sake, but God knows what she sees in you."

Such acting was part of his role, the background of his appeal. By offering self sacrifice he hoped to assault the weakest spot of Velna's defense.

HE came more frequently after that, making obvious his hands off policy, severe in his attitude toward her, but bearing in his handsome eyes a taunting daredeviltry.

He pretended heartbreak with a smile; and Velna begged me to be quit of him. I did not guess then how he terrified her, but I was glad to take her suggestion, and closed the lab, while we went on a short cruise to Mars. On that trip, at least, the old happy times came back with all their unspoiled simplicity. On the rim of the oxidized cliffs of Syrtis Major in the northern hemisphere of the planet, we were married, with the rare oxygen of Mars making me less giddy than the knowledge that at last Velna was mine, safe from Molerri and all the Universe. As I kissed her under the faint light of Deimos, Phobos also hurried up from the west as though to add its blessings to that of the slower moving moon. Only one of my temperament, lost in the obsession of a great science and a greater love, might understand the bewitching trance of that Martian night as Velna and I got into our gyro and soared around the whole girth of the planet merely to be together away from the company of other men and women.

That night there seemed to me no limit to my ambition nor to my ability to obtain it. Molerri, even, had nothing so precious as I, and the slow achievement I had made, seemed then more weighty, more enduring, and I blessed Fate and the thread she unwound for me and we shortened our honeymoon to return to earth and be at work together.

Molerri was at the port when our space liner spiraled down into the tropopause, and he ran forward when the ship crunched gently into the rubber packing of her dock. He greeted Velna gaily and then congratulated me soberly.

We dined together that evening aboard a strato-ship, homeward bound, and Molerri was full of himself and a new conquest which was to take his ship, faster than light, to planets unknown. He was dissatisfied, he said, with the power of the smaller ampliscopes aboard his vessel, and he wanted a look much deeper into the heavens. Would I be good enough to allow him to hang around a while and play with my largest ampliscope?

Pluto, the last planet of the system, had been contacted when Molerri was twenty-four. Now he was thirty and the Elrock exposition which he so flagrantly ignored, were six years on their way back across the void toward earth.

With that exposition, until Molerri had evolved his new combustion, it seemed that men had at last reached the very periphery of their activities and could thenceforth, like Moses on Nebo, but look into the promised lands. And the old 10 miles per second was an astonishing velocity when analyzed, though it must have seemed a snail's pace to Molerri with his gaze and his thought moving across light years of space.

Beyond Pluto was his battle cry, and since he knew the secret of power fuel more violent than oxygen-gasoline combinations, there seemed no reason he should not go down into Canaan, if he chose.

In my heart I wished he would, and yet I wondered if after all he might be over confident. Beyond the Solar system space was staggering in any equation. Both Alpha and Proxima, the nearest stars to our system, were four and three-tenths light years away. To reach them at Elrock's velocity of 10MPS would require seventy-nine thousand years! So I watched dubiously as he worked the ampliscope here and there, calling upon Velna and myself to look, first at one planet and

then the next, and laughing at the deep holes which awed us, even though our senses could not grasp the profound depths across which we peered.

ONCE I protested that he had no right to influence a crew to try what must be certain oblivion. I reminded him of the embryo stage in which all human achievement existed. Molerri did not seem to hear me at all. His eyes were fixed on Alpha Ursae Minoris, three hundred light years from earth and earthly caution, yet beyond the wildest chance of even Molerri's ship ever reaching it in the life of a nation, unless indeed he had far more power than the velocity of light. When I put my own eyes to the duplicate binoculars, I discovered a small watery satellite revolving around the North Star.

I looked at it a while, my imagination aroused, then Velna and I left the observatory. When we came back half an hour later, Molerri was still looking. He turned away from the instrument as we entered, and his eyes were bloodshot and his face looked tense and strained. He looked at Velna and through her, as though afraid to meet her eyes.

"Going over?" Velna asked quite unconcerned.

He smiled, shook his head. "I wish I might, Wonderful One. But Alpha Minoris would indeed require a magic carpet."

He got up from the chair, went out the door and crawled into the cock-pit of a small blue gyro, and fluttered off without even a goodbye. But he was back the next night, and again that satellite was the object of his attention. He named it Terrania, because of its similarity to earth, and we found by double amplifying, we could bring it up close in sections, so that we viewed it as from an overhanging bridge, or a low floating gyro.

Then came that night I shall never forget. I was trying to clarify a far distant nebula, quite unsuspected before the invention of my ampliscope. From Molerri's field came the thunder of rocket exhaust. I took my eyes from the ampliscope, to stare at an arc of fire that vaulted from earth to sky with such velocity it could not have been other than Molerri's space ship.

Again he had gone without goodbye, or warning to any one, off on another giddy try for distance, or velocity, or to try a new secret compound. Not one of the curious population that rushed into the streets knew just what he might be about. And then for one brief, staggering minute I heard Velna's voice in my loudspeaker. "Milton," she said, and her voice was infinitely sad, but bitterly determined, "I'm aboard Molerri's ship. I—I don't know how to explain—" and then her voice had either failed or thinned out as the ribbon of fire pinched into a last fading thread through the Kennelly-Heaviside layer and the wave-length of her voice no longer reflected back to earth, but out and out, God knew where.

I swung the ampliscope to find the pinched out thread of fire. No light came into view except far off E. Eridani, twenty light years out in space. I raised the power and Erandi blazed hot in my eyes. I remembered suddenly Alpha Ursae Minoris, and swung the scope to cover it. Terrania rolled out of the void to swell beyond the field of my screen. I was a fool to even hope. That planet, close as it appeared, was three hundred light years away even if Molerri's ship had the velocity of light. Molerri's rocket, like Velna's voice, was swallowed in the void, and suddenly it struck me why that could be, though there were only light years of empty space around, and nothing at all to hide him. He was indeed travelling faster than light. Somewhat as strato-ships

travelled in absolute silence because their velocities outstripped the waves of sound, so Molerri's ship was outstripping the power of sight, though there in full view before me, he was outstripping the light that would have revealed him.

Though stampeded emotions cried out for me to follow, demanded that I commander the twin ship which Molerri must have left in the field, to go in pursuit, I swallowed my terror for Velna to command every faculty of my mind. Not for a moment then did I believe she had wanted to go. Molerri had kidnapped on a sidereal scale, and her voice to me was but his command. That I believed and wanted to believe. Sober thought concluded that the ampliscope was the quickest servant, and that with patience Molerri would be searched out. Only a few planets could possibly offer a refuge. These were parsecs apart. Common sense said, wait and watch. When the ampliscope discovers them, that will be the time to follow. Terrania, X2463, ZY 3297, and one small planet we had called Verdi because of its luxuriance, seemed to bear closest watching. Verdi, too, was inhabited, and Molerri liked society, he fed on it. He would never be content to strut before Velna alone.

A WEEK passed, a month, my watching became methodical. So many hours to watch; so many to sleep, with one of the clerks beside the scope. Slowly I wound the viewfinder back and forth across the latitude of those two spheres, and now and then in a fit of fear turning back to X2463, and even to Terrania, wondering if there might not be some unknown celestial law which would permit Molerri to land on that watery spheroid which he had longed to touch. Nothing rewarded my search at all, and one day followed another, each promising to me a hope and

each leaving with me despair. Twenty years I searched the heavens, sector by sector, discovering the depth of it, the bleak illimitable caverns of space, and not one sign of the mammoth ship which had lain so monstrously magnificent in Molerri's Rocket yard until that tragic night.

My eyes took on a hollow strain from constant searching, my hair turned white as the frost cap of Mars, and my soul learned patience and resignation and the helplessness of undying hope.

I knew in my heart all those years that Molerri was there somewhere in the space before my eyes, faster than light, leaving no reflection for my scope to touch. Sometimes my patience became so strained I was almost persuaded to follow blindly, to cruise like a Wandering Jew of space in hopeless search of the limitless places that he might be, following blindly on and on, rocketing out to Verdi, maybe, on that one lone chance that this would be his port and that men could live and that the people were friendly. That would have been Molerri's way, that would, I later discovered, have been the successful way. But I had faith in my all seeing eye, so I kept the rocket equipped and made it more modern year after year, and was ready to follow at a moment's notice.

Years hardened my hate and meliowed my love, and then one night I brought the focus of my scope upon Verdi for the hundredth time that month, and there it was, the long gray tube anchored to a hill above the flat Verdian city, and around it rolled a thousand spheres with gaudy shining colors, and from the airlock stepped Velna, haughty, and beautiful and young. Molerri strode beside her, offering her his hand at the stair, and I saw her chin raise a trifle as she cringed from him, and it seemed that she was more beautiful even, than I have ever

seen her before, for it had been so long, so terribly long, since I had seen the living reality of her, that even my dreams were shot of this almost meeting with her once more.

Verdi, at last. They had landed on that little planet which swings around E. Eridani! Why had I not gone out on the chance—this one blessed chance that I had not dared? My whole scientific training had been against it, against quick conclusions, rebelling against unproved theories. But now, I knew, and I sat wondering. My hair was white as a rat's and my cheeks were hollow, and my life despondent and moulded for its coming old age. Twenty years had gone and I was forty-nine. I looked into a glass above the table. One who had not known would have taken me for fifty-five. She was not a year older, to look at, than when I had last seen her there beside me, encouraging me to strive on and on, urging me never to give up the work. She was the kind who would retain youth, she knew the value of thinking young thoughts and keeping in trim, and there was probably the non-decay of empty space to aid her. What would she think of her old man suitor? I trembled, but only to smile again. I knew Velna—she loved me.

Slowly Verdi turned on its axis until rocket ship, Velna and Molerri were swept to the far rim and drowned in shadow, and I sat dreaming, hugging to my heart this vision renewed.

ABOUT midnight I shook off the mood and called the Rocket yard. About daylight I went down. The commander of the ship, Admiral Cooglagh, a distinguished Martian, spoke to me in Esperanto. "We can be ready within the week," he said cryptically. "We are each of us eager for the adventure. But sir," he hesitated and his eyes searched me soberly as though he were trying to say something difficult to ex-

press, "Verdi, sir, is twenty light years from earth. That which we saw last evening would have happened a long time ago."

Cooglagh was right, I knew. Even allowing that the light from Verdi was very tired and slow, that ship must have landed no later than ten or fifteen years before. Even with power fuel more violent than that of Molerri's, there was a grave chance I was following no more than a will-of-the-wisp. They might have been killed, or died, or forced to leave the planet long ago. And yet I was determined. Now that I knew where she had gone, I could no longer be content with searching the heavens from my studio chair.

The next evening proved Cooglagh was entirely right. Even as I watched, the rocketship quivered and rose from Verdi trailing a fiery arc from her exhausts. In a few seconds she dwindled away and then was blotted from sight, though I frantically raised the amplifiers to their powerful limits. Gone—faster than light—lost before my eyes.

Squeezed empty as a sponge in a violent hand, bleak as the void, my heart urged my trembling fingers to the levers and dials in futile panic. All night I searched, and with a day shield across the lens, refusing to admit the hopeless truth that Molerri was beyond all power of my machine, escaping the pulsations of light. Perhaps, I thought, with patience, with untold patience, I may some day catch her again, when he stops at some more remote sphere, hungering for the feel of land. He may stop many times before my focus is timed to the planet upon which lands, but with patience, with untold patience, I shall see her again . . .

That thought held me for a while, but in my heart I knew that space was too big and life too short, that unless a miracle was wrought I had seen Velna for the last time. Perhaps I became des-

perate then, perhaps childish when there was no reason for it at my age, but any man who lives the past over and over and over again, is obsessed.

But there was much for me to gain, there would indeed be all for me to gain. What more can any man grown old, prematurely or with sufficient years, desire than to live again the most fascinating period of his life? There was a way, I knew, that I could see Velna—a way that science could bring her back to me again and again like a dream already lived. Cooglagh had suggested it to me that day when he had warned me that Verdi was twenty light years away and that the picture of the scene upon that planet had taken place years before.

Cooglagh came. "You still want to try?" he asked somewhat too kindly. By his manner I knew that my days in the saddle might soon be over.

"Not Verdi," I barked trying to show him I still had some fire. "Our course will be directly opposite. Follow the light of Verdi. No! No! Not Follow! Exceed it. Overtake that light which was here yesterday!"

THAT night we roared out into the void. Earth dropped from us in blurred blankness which soon swallowed the ship. Only mechanical instruments were in control, for we were soon travelling faster than light, faster

than we could see! There was no sensation of space or time until the blurred walls took form again when the controls slackened away our speed, and we seemed halted far out in space where there was neither earth nor sun, but stars to all eternity and a bowl of emptiness in which our ship hung like a speck.

Cooglagh adjusted the ampliscope and I pressed my eyes to watch the magnified images upon its screen. Mollerri's rocket was back upon Verdi as I stepped up the view with fingers trembling upon the dials. She was there, fresh, young, intimately beautiful. My heart caught in my throat and I called out her name, though I knew that the planet was far away and the Velna I saw was a girl that belonged to the long ago, reaching the ship on lagging wings of light. She moved down the stair to the weird and alien planet among the moving spheres. Then she was running back again, swiftly, Moleri at her heels. The airlocks closed and the ship rose, followed by a swarming riot of color.

Then Cooglagh came to my side. "Further out, sir?"

"Yes, yes," I demanded and then slowly I shook my head.

"No, not now. Perhaps some other time, my friend. Let us go back to earth."

It would be senseless, I knew, chasing on and on after yesterdays . . .



himself in this great story!

And there are, in addition, two big feature-length novelettes by Lloyd Arthur Eshbach and Robert Moore Williams, and two beautiful short jobs by Nelson S. Bond and Hubert Mervin. And—brand new *DYNAMIC* departments! (The letter department, in this first issue, answers *MARVEL's* overflow mail—so if your letter is not answered in this issue of *MARVEL*, you might find it in *DYNAMIC*.)

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Write us your questions on scientific subjects. So far as space permits, all will be answered in these columns. Preference is given to those which seem of the most general interest. Tell us what you think of our choice.

THIRD SIGHT

Dear Sir:

Are the expensive new eye lenses better than ordinary glasses or spectacles? I have found it difficult to get information about them.—K. N., Fort Dodge, Iowa.

The superiority of eye lenses rests solely upon their invisibility—and consequent gratification to the wearer's vanity. Thin shells of the same glass as ordinary spectacles, they fit snugly over the eyeball, ground to the proper corrective curvature and undiscoverable to even the closest scrutiny. Moreover, if you don't like your eyes as Nature painted them, you can have the pupils of the artificial lenses any color that pleases your fancy!

Comparatively speaking, however, this is but a paltry achievement in optics. Now, with tri-focals for those whose work requires sharp vision at several different distances, with glasses that magnify as much as twelve times and make sight possible for all but the stone blind, with freak spectacles that see around corners, science indeed can be said to have surpassed second sight!

Opticians now are able to grind three—even four and five!—different curvatures onto a single lens. Spectacles are made as powerful as opera glasses, and no larger than pocket microscopes. And with small prisms in your glasses to bend light rays at right angles, you can look straight ahead and see what is in your lap, or—more intriguing—lie at ease flat on your back in bed and, without even having to hold it up, comfortably read your copy of **MARVEL**.

Another interesting type of spectacles has no lenses at all! Glass is replaced by steel discs, in which there are only pin holes to permit the passage of

light. Used in steel mills, foundries, etc., these odd "glasses" cut down the intense glare while protecting the eyes against hot ashes and flying drops of molten metal.

In this last case, strangely enough, science almost seems to be copying a feature which some quirk of evolution gave to the Pearly Nautilus—a creature with a hole in its eye! No pupil or lens has the eye of this small mollusk, only a thin membrane like a kettledrum. In its center is a tiny hole to admit sea water and it is this which serves as a lens.

From other quarters, too, have come new aids for vision. Surgeons now cover the opaque spots that sometimes form on the cornea or transparent outer layer of the eyeball, diffusing light and impairing vision, by tattooing them with gold and platinum! Optometrists, since any lens works best in monochromatic light and the human eye is most sensitive to yellow, put amber glasses, "tuned" to this color, on hunters! And to relieve fatigue and sensitize the eye with a complementary color, blank green cards are placed in front of girls who work at sorting oranges!

Delicate lathe work and machining also is now done under the monochromatic light of mercury—vapor tubes, whose yellow green light will reveal the slightest flaws in sheets of stainless steel and other bright metals. Nor have the electrical engineers forgotten to tailor vision for comfort. For our homes there are now fluorescent lamps in which an electric current passes through mercury vapor at low pressure, producing an ultraviolet radiation which is re-radiated by chemicals as cool, clear light of any color you choose!

From all sides, indeed, the eyes have it!

NEW ELIXIR OF LIFE: DRINK TILL YOU'RE THIRSTY!

Dear Sir:

I read some time back that a hairy mammoth which had lived ten thousand years ago was found frozen in a Siberian bog, with its flesh and hide perfectly preserved. What is the possibility of life itself surviving under such circumstances, considering that many animals are able to hibernate for long periods of cold weather?—D. P., Long Island City, N. Y.

Unwilling as we should be to admit that higher organisms may survive for long periods of time under conditions ordinarily considered lethal, when we consider that spiders can subsist for five hundred days without eating, that fish thrive in the boiling waters of hot springs, that flies survive absolute freezing, it is hard to ignore the incredible persistence of life, the tenacity with which it refuses to be extinguished! Let us examine the circumstances of a few notable cases of hardiness.

Dog ticks, it has been found, can live as long as three years sealed in glass tubes—and without food! This ability depends on a low rate of oxygenation and a metabolism of nearly zero. Unless warmed, they will remain immobile indefinitely. Thus cold is seen to be an important factor in retarding the rate of living.

On the other hand, certain algae succeed in acclimating themselves to the boiling temperature of volcanic pools! This remarkable example of adaptation has raised the serious question of whether there may not be life even on some of the hotter stars. Why not?—when at the other extreme of the temperature range, microbes have resisted 422° below zero!

But it is in the effect of more moderate temperatures, less destructive to delicate tissues, that we are interested. Frogs eggs, kept cold, develop more slowly into tadpoles, and flies live eight times as long at 50° as at 85°! Could warm-blooded animals—could *man*—increase his span of years in this way?

It has been estimated that if our *body* temperature were reduced to but 60°, we could all live to be as old as Methuselah! At 45°, our long, lethargic span of life would let us greet the *fortieth*

century. And now a process, as effective in reducing the metabolic rate as a lowered body temperature, has been discovered by science!

Heavy water, in which the hydrogen has an atomic weight of 2 instead of 1, had already been used in experiments on plants, where it was observed to drive out ordinary water. Recently, however, it has been tested on men, and is now known to retard the chemical reactions which characterize life! Thus it may be that in the future we shall drink, without ever quenching our thirst, heavy water—the new elixir of life!

BEYOND THE BEYOND

Dear Sir:

Would you explain what is meant by the red-shift mentioned in so many astronomy articles.—A. G., Evansville, Ind.

The so-called "red-shift" is an observed reddening of the light from the most distant nebulae, a shifting of *all* light toward the red end of the spectrum. The phenomenon has long been interpreted as due to the velocity with which the nebulae are receding from us. As such, the explanation forms the backbone of the theory of the expanding universe, first advanced by Lemaitre, which postulates an explosion some score of billions of years ago that sent all the cosmic bodies rushing away from some central point. Another support of the theory is the explanation that the cosmic rays, particles which bombard the earth from some outside source with energy as high as ten billion electron volts and are capable of smashing through sixteen feet of lead or sixty feet of rock, had their origin in that same stupendous explosion. But recently both these supports have been taken away—and now we can no longer be sure what sort of universe it is that we live in!

If the cosmic rays originate *outside* our galaxy, the Milky Way, cosmic radiation should vary throughout the day. More should be received in the northern hemisphere than the southern because the former is the forward moving side of the earth in the rotation of the galaxy. It is, as the analogy has been offered, as if we were riding a merry-

go-round in the rain: we should expect to be struck by more drops in the face than on the back of the neck. But extensive studies all over the world have shown that the effect is less than one-tenth what calculations demand—and so the cosmic rays must originate *inside* the Milky Way!

As for the red-shift, if it is due to the expansion of the universe, the density distribution of cosmic bodies should increase outward regularly in all directions. Since it does not, a curvature of space must be assumed to account for the discrepancy. The necessary curvature would give the universe a radius of about 500 million light years—and place its limit just beyond the penetrating power of our present largest telescope!

The alternative to accepting a small (to the astronomers) expanding universe, little larger than may be surveyed by the 100" Mt. Wilson telescope, is to account otherwise for the red shift. Does light lose energy on its way to us and therefore redden because of absorption by intergalactic dust? It has been calculated that if all the stars in the region of our sun were expanded into a uniform layer of gas, there would be enough for only two atoms per cubic centimeter! The total amount of diffused interstellar matter can not be greater than that which is concentrated in the stars, or it would exert an observable attraction on the stars. And if the atoms of that star dust were assumed to be the heaviest known, the total resistance offered to light crossing the entire universe would still be less than that offered by a foot—of air!

Thus we are left to choose between a universe which is finite but expanding, and one which is indefinitely large and not growing appreciably. But what principle could govern the form of that immense universe of unknown proportions? Can we ever know? Strangely, the answer is that we may—soon!

In 1940 the new 200" telescope of the California Institute of Technology will be ready for use—and it will reveal to the eye of man *eight times* the volume of space he could formerly see! In this greater section of the universe, if it be indefinitely immense, may be found a clue to some principle upon which it is formed, some truth of Nature stranger

than *fiction* may *dare* and beyond the very power of the human mind to conceive!

And, equally staggering to the imagination, is the prospect that if the universe still is found to be a small, finite sphere, we may look *beyond* it into—*what?*

SHOCKING CONDUCT OF EELS

Dear Sir:

Is an "electric eel" really electrically charged?—W. E. C., New Orleans, La.

Indeed! One South American species of electric eel has been found to have an output of 50 watts at 500 volts! Its current led off by three metallic garters clipped to its four foot, ten pound body, this bright fellow was able to light a neon lamp—and then broadcast his success as static over a loud-speaker system!

Less playfully inclined is an African catfish which generates an electric current in its glandular system. Using it to shock other fish, it lives on their vomit!

Electric eels, however, seem to exercise a stronger fascination on the imagination of some men. One scientist, in all sobriety, has gone off to the Brazilian tropics to learn the answer to a certain question concerning their behaviour. He has not been heard from yet, but when he returns he hopes to be able to tell—what happens when one electric eel shocks another electric eel!

EARTHQUAKES AND EARTHQUAKES

Dear Sir:

I have read with particular interest of experiments in which solids have been broken down by means of supersonic vibrations. May I ask whether, in your opinion, the walls of ancient Jericho could have been cast down in this manner, by the perambulations of the besieging army of Israelites, their chorused shouts, and the blasts of their horns?—D. D., Philadelphia, Pa.

Ten years ago an earthquake rocked northern Palestine, where the Jordan runs swiftly between banks of loose clay, forty feet high. As the tremor struck, the towering banks suddenly collapsed—and for twenty-one hours

(Please turn to page 125)

THE WEATHER ADJUDICATOR

by

STANTON A. COBLENTZ

Author of "Lord of Tranerica," etc.

Utter devastation faced the little nation of Nesbia, when Dictator Strumpf's giant thermostatic climate-controlling machines brought about a ghastly social crisis!

I

DOCTOR JAN HUROVI, Government meteorologist and chief technical adviser to Chancellor Joseph Strumpf, sat in a great sentry-guarded room across from a bald-pated, square-headed individual in a military uniform. Above them, on the wall, stretched a twenty-foot map of the little Central European nation of Nesbia, which had been created two decades before by the treaty of Krass-Wilmotz; opposite them was a newly turned calendar, with the date in red letters: "August 16, 2039."

Speaking in a dialect compounded of



Men fell by the thousands like
autumn-stricken flies

twenty European tongues, Doctor Hurovi pounded again and again on the huge oaken desk as his words came forth in a fluent outburst. "Yes, Your Excellency," he exclaimed, excitement brimming his sunken little black bulbs of eyes, "this is what men have been dreaming of for tens of thousands of years, but have never for one moment thought possible. I myself, my dear Chancellor, have been working on the idea for more than thirty years. For the past fifteen, I have had an army of dozens of assistants experimenting at my side. I am not premature in saying that I have mastered the problem which will revolutionize human life!"

Chancellor Strumpf stared at his subordinate long and coolly out of his greenish blue eyes that blinked from amid their layers of fat. "It is a daring idea," he acknowledged, tapping absently at the medals on his breast. "When I set aside unlimited funds for experimentation, Doctor Hurovi, I did not expect you to attempt anything so radical. Let me see if I understand you fully. You propose, you say, to bring the weather under control? To regulate the climate of the entire country?"

"Yes, your excellency. By a set of thermostatic controls. One man, turning a switch that a child could operate, will be able to adjust the temperature of all Nesbia to within a fraction of a degree."

"It sounds a little too simple to me," confessed the dictator, leaning far back in his swivel chair and clasping his scarred old hands together above his head. "To tell the truth, I am not quite convinced of its advisability."

"But isn't this what all men have been hoping for ever since the first cave man shivered in the darkness?" pleaded the meteorologist. "Hasn't every race dreamt of controlling the weather—some by magical incantations and prayer, others by scientific study? Hasn't the weather man been cursed

more than the devil himself for his storms, his droughts, his untimely rains, his extremes of heat and cold? Hasn't bad weather had as much to do with changing the course of human history and economics as all the wars put together? So what could be a greater boon to any country than efficient and scientific weather regulation?"

"Well, perhaps—perhaps," admitted the Chancellor, shaking his head a little dubiously. "Now what did you say is the principle behind your new weather machine?"

"It isn't exactly what you'd call a machine. It's a whole connected nation-wide network of machinery. The principle itself is a familiar one. It's the same, in essence, as the central heating and cooling devices of our houses and public buildings."

"What!" demanded Strumpf, bending forward with a start. "You mean to say you're going to centrally heat and cool the whole country?"

"Precisely that, Your Excellency. By modern hydro-electric drills, as you know, we have been able to bore about fifty miles into the earth's crust, and have found the temperature down there to be somewhat above the boiling point of water. In other words, we have unlimited stores of energy waiting to be tapped. In the winter, it will simply be a question of running great air currents into the depths, heating them, and releasing them through vents scattered over the country. And in the summer—"

"Yes, in the summer, Doctor Hurovi?"

"The problem then will be only a little more complicated. Heat, as you know, is convertible into electricity, which in turn can be used to operate vast mechanical refrigeration plants. These we will scatter throughout the nation, using them to send out cool breezes to temper the hottest July days."

"Offhand that sounds easy enough," conceded the Dictator, his little eyes screwed together quizzically. "But have you any idea how much energy it will take to warm or cool a country of fifty thousand square miles?"

Doctor Hurovi snapped a notebook from an inner pocket, and revealed pages covered with thousands of minute figures. "Yes, Your Excellency. I have it reckoned here in kilowatt hours. Theoretically, of course, we could secure power for ten countries like Nesbia. Actually, however, it is a question of obtaining workers enough—as well as of outlay for equipment. But, according to my figures, an expenditure of two hundred millions for materials, plus the labor of ninety thousand men for seven years—"

"Well," interrupted the Dictator, leaning forward with the first sign of eagerness across the polished expanse of the great desk, "if it only takes two hundred millions, we might manage that. We'll raise it in no time at all by increasing the postage rate and putting a new tax on cosmetics and other amusements. And as for the ninety thousand men—why, the idea's a splendid one, Doctor Hurovi! It will help solve the unemployment problem, which has been worrying me quite a bit now that we have no wars on hand."

II

FIVE years more than the estimated time had passed before the Hurovi Automatic Weather Adjudicator had been installed and was officially announced to have passed all tests. A series of unavoidable delays had postponed the actual process of weather regulation until the middle of the century: first the death of thousands of workers owing to their exposure to pockets of poison gas in the five-

mile depths; secondly, the difficulty of operating the hydro-electric drills by remote control in those deep cavities where the heat would have roasted anything of flesh and blood; and, finally, the problem of distributing the hot air once it had been obtained in the necessary millions of cubic feet per second.

But by the early autumn of 2051, the last of the remaining obstacles had been thrust aside by Hurovi and his corps of experts, and the electrifying announcement was made that the process of weather control was to begin on Monday the ninth of October. The country was jubilant; a national holiday was declared; flags were waved, banners flown and patriotic anthems sung as the people lined the streets of every city by the thousands, loud with the praise of Dictator Strumpf and his unparalleled accomplishment. At precisely noon, two hundred thousand hot air vents each many yards across (or four for every square mile in the country) were to be flung open amid a blare of horns and the screaming of sirens; and, within an hour or two, the temperature was to be raised from the chilly autumnal fifties to the uniform seventy-two which had been established by Dictatorial decree as the proper level for summer and winter, day and night alike.

It dimmed the popular enthusiasm a little that Mother Nature, as if reluctantly surrendering control of her time-honored realm, had decided to blanket the entire country in a dismal, unremitting rain on that day of all days. It was a little annoying to observe how, even after the charmed hour of noon, the downpour continued, without sign of diminution, as if the very elements had set out to defy Chancellor Strumpf. The temperature did, indeed, go up almost exactly on schedule; and by three in the afternoon a thick, steamy heat pervaded all parts of the country except the border regions, where unauthorized air insisted in blowing in with utter dis-

regard of national lines. Doctor Hurovi in a radio address at ten that evening (when it was raining more heavily than ever) announced that it was no part of the plan just then to control precipitation, merely to adjust temperature, and that, judged on this basis, the project was succeeding "most gratifyingly."

During the months that followed, Nesbia was to observe some curious sights. Birds southward bound to a winter home in Africa were seen to waver in their flight, circle around in bewilderment, and settle down in the evident belief that Africa had strangely moved north. Trees shed their foliage lingeringly and reluctantly; violets bloomed in December; peach and apple blossoms began to unfold in the bland January air. Tomato vines, instead of withering with the frost, continued to bear fruit all winter; fresh cantaloupes graced the national bill of fare on New Year's day. But not only the temperature—the very condition of the atmosphere had been altered. The rapid evaporation due to the heated air caused unseasonal clouds to gather, and ushered in Christmas Eve with a violent electrical storm; while from time to time, in the border regions, invasions of cold air from neighboring countries brought a momentary chill, which the people were ill prepared to meet. The latter problem, however, was partially solved by an increase in the hot air distribution to the borderlands, with the result that much foreign territory enjoyed the benefit of a higher temperature owing to Strumpf's liberal program.

To read any newspaper anywhere in Nesbia, one would have been convinced that Doctor Hurovi's invention was a consummate success, and that nowhere was there any one who thought otherwise. But Nesbia, being a well managed dictatorship, had not neglected that important branch of government, the Bureau of Censorship; and all the

papers, consequently, were reflections of the mind of one man. How the people felt was a matter that did not count; for the people were ciphers whose sole purpose in existence was to add to the ruler's glory. To murmur against any of the dictator's acts was treason; to complain against his adjustment of the weather was high treason, punishable in extreme cases by death. It was privately whispered (after due precautions had been taken to bar all doors) that special concentration camps had been established, where thousands of rebels against the weather were confined. Some of these, it was said, were manufacturers of overcoats, mittens, woolen socks and other winter apparel, who had been driven out of business by the new order of things. Others were makers of snowshoes, skis, etc., and proprietors of hotels in regions formerly noted for their winter sports. Still others were youths who had incautiously bewailed the end of ice skating; while numbers of gray-haired irreconcilables, religious fanatics and other opponents of progress were incarcerated for proclaiming it to be "unnatural" and "wrong" to "try to make June out of December." But most numerous of all the prisoners, according to popular report, were the children who displayed criminal tendencies so early in life by lamenting the absence of snow.

As winter dragged along into spring and spring into summer without the immemorial seasonal changes, public speakers and the press continued to voice their unanimous acclaim for the new order. However, there were certain signs which even the most enthusiastic advocates of artificial weather had not failed to note. One was that the insect population of Nesbia, benefited by the new mildness of the climate, had thrived and multiplied prodigiously. Flies, instead of dying off in autumn, had buzzed all winter in the stables and kitchens of the land; and there

is no estimating how many gnats went to their death in midwinter soups. Ants did not cease from their labors; caterpillars by the millions devoured the fresh-sprouting January crops; while never was such a pestilence of mosquitoes known as when the normally frozen ponds and rivers gave forth their myriads of biting pests. Parasites of fruits and trees, moreover, seemed in their heyday, and, with the genial winter to encourage them, gave more trouble to gardeners and farmers than ever before within man's memory.

III

ON the first anniversary of the installation of "weather conditioning," Doctor Hurovi was summoned to the palace of Chancellor Strumpf. He found the latter stamping up and down the length of a great sword-lined study, his gnarled hands running across his shining pate as if raking the ghost of his long-vanished hair. "Sit down, sir!" he greeted the meteorologist; then continued ranging the floor for a few minutes longer as if he had forgotten his visitor's presence.

Finally, clearing his throat and uttering something halfway between a groan and a growl, he whipped a long typed document out of his pocket, and unfolded it before Doctor Hurovi. "H'm!" he grunted. "H'm! Just look at this, will you? The official report—strictly secret, of course—of the results of our first year of climate control."

Doctor Hurovi adjusted his spectacles, puckered up his brow, and let his eyes range along the columns of figures. "Well, well, Your Excellency, we must give it more of a chance," he pleaded. "These—these health figures—are they strictly authentic?"

"Absolutely so! The death rate, you

will note, has gone up fifty-three per cent during the past year. Can't say why. Physicians claim, however, that the human frame for ages has been adjusted to varieties of season and temperature, and loses its vigor and resistance when the climate is too easy and uniform."

"Well, at least, the facts haven't—haven't been made public?" demanded the inventor apprehensively.

"Naturally not! My orders are strict on that score! Only the other day I was forced to send an eminent consultant to a concentration camp for advising a patient to remove to a harsher climate."

The dictator took another turn about the room, bit his lip, and then went on, "This isn't even the worst. We could spare a few people out of our nineteen millions. But have you observed our crop reports?"

"I—I've had intimations," acknowledged Hurovi, with a wry pursing of his thin little lips.

"Intimations? Then look at these figures!" growled Strumpf. "Our crop of winter wheat—usually world-famous—was a complete failure. Weather too mild—unseasonal fungus developed—result, the farmers are desperate—though I'd like to see the one that would dare to admit it! Then this summer, you know, the grapes in our southern provinces hardly ripened at all—held back by the refrigerated air and the incessant rains."

"Well, after all, the rains were to be expected," the meteorologist pointed out. "When currents of hot air from other countries struck the cooled air currents here, the effect was to make them lose their moisture by means of precipitation. Don't forget, we had rain even in the old days. I'm working now on a scheme to overcome this—h'm—this unfortunate by-product."

"Unfortunate isn't the word!" grumbled the dictator, clicking his heels to-

gether in a military fashion and facing his visitor with a defiant air. "Perhaps it hasn't escaped your attention, sir, that our rivers have been close to flood stage all summer. That we have had to spend twenty millions reinforcing dikes and embankments. That the water actually did overflow in Lower Kratz province, driving thirty thousand people from their homes and ruining crops over scores of square miles."

The inventor lifted his eyes as if for help to the tall walls emblazoned with coats of arms and bristling with halberds and spears. "Every milestone in human progress," he sighed, "is marked with a few minor drawbacks."

"Minor drawbacks?" thundered the dictator, glaring at his technical adviser with snaky-hard black eyes. "Minor, you call them? And is it minor, may I ask, when we have diplomatic representations from our neighbor Vestubia to the south, complaining that we are making their weather in winter too warm, and in summer too cool? Is it minor when Transvania to the east gives us notice to cease causing high waters in our rivers which pour across the border and flood their lowlands? They say the Transvanian peasants are all up in arms. And, remember, they have a standing army of a million."

"Pooh!" scoffed Hurovi. "We have a standing army of two millions!"

"Very true," acknowledged Strumpf. "That is why I can afford to ignore their appeal. Still, I should dislike very much to be forced into a war merely on account of the weather. If we fight, it must be for some high principle, such as destroying democracy and the right of free speech."

He smiled slightly at this thought; looked up hopefully at the glistening weapons on the wall; and then went on, "These things have all been getting on my nerves, Hurovi. To tell the truth, I've been feeling the need of a change

—change of climate. I haven't been quite up to my usual self. This winter I'm looking to taking a trip incognito up north—Scandinavia and Russia—where I can get a breath of good snappy air in my lungs. And next summer, if I can arrange it, I'm going down south—Morocco and Egypt."

"Wish I could join you!" said Hurovi, nodding dolefully. "I haven't been quite up to form either this last year." And then, tapping nervously at his side, he went on apprehensively, "But no matter what happens, Your Excellency, no matter what happens, you do not intend to abandon the great experiment, do you?"

"Abandon it?" The Chancellor brought one foot down against the floor with an angry clatter. "I thought you knew me better than that, Hurovi. No dictator ever abandons anything. He cannot afford to. To abandon an undertaking would be to admit himself wrong. To admit himself wrong would be to confess that he is human. To confess that he is human would be to acknowledge that he is unfit to rule. It is a vicious circle. The more mistaken I am in any venture, the more stoutly I have to cling to it. Between you and me I don't mind owning that I'm beginning to have—well, just the vaguest doubts as to weather conditioning. But just let any one so much as intimate this fact in public—and, by my sword, he will pass the rest of his days behind stone walls!"

"It's admirable, Your Excellency," the inventor remarked with an awed smile, "what devotion to principle you have!"

"Yes—that's why I've been able to remain in office. Of course, there will be no turning back on this issue. I've given orders to the Bureau of Propaganda to redouble its proofs of the success of climate control. I've instructed the Department of Statistics to demonstrate it with fresh figures. And—most

important of all—I've sworn in five thousand new deputies to help the Ministry of Espionage comb the country and bring in all traitors who have whispered against the weather."

"By all means, Your Excellency! No fate is too severe for such Reds!" approved the meteorologist, as, with a bitter smile, he turned and left; and, sneezing once or twice, lifted his umbrella and went out into the uninterrupted downpour that had been hiding the sun for the past eleven days.

IV

MEANWHILE, in half a thousand places throughout the country, little bands of disgruntled men and women were convening. In basements and attics, in remote country groves, in caves, and behind the drawn blinds of private houses, these groups were laying their plans for "The Revolution"—the great rebellion that was to restore the native climate. The difficulties were many, and the danger of spies omni-present; many of the plotters were seized and never heard of again; some deserted through fear, and others betrayed the "Cause" for money; but the leaders never wavered in their determination to return to the weather of their fathers. Within two years of the date of the installation of climate control, it was believed, sufficient men would be armed and organized to overthrow Chancellor Strumpf.

But before the time had come for the rebels to strike, a storm arose from an unexpected direction, and put Doctor Hurovi's great invention to an unlooked for use. The countries of Vestubia and Transvania, allying themselves with the still larger nation of Strangland, had decided on armed action in protest against Strumpf's interference with their weather. After some

preliminary diplomatic negotiations, during which Strumpf had loudly proclaimed the "inalienable right of every country to regulate its internal temperature," Vestubia and her two partners in arms had mobilized their armies, and had given the electrifying order "March!"

Observers throughout the world were astonished at the apparent calm with which the Nesbian dictator took this adverse turn of fortune. It was known that the three allied nations outnumbered his in man-power in the ratio of two to one; known that their equipment and resources were double his own, and that his frontiers were not amply fortified against the threatened invasion of three million men. Yet Strumpf, far from appeasing the enemy by offering some slight concessions in the way of weather, actually goaded them on by a speech in which he boasted that Nesbia would never give up one degree of its temperature.

Still more surprising were the steps that the dictator took to meet the invasion. There were those who privately wondered whether old age were not weakening his wits; for certainly there seemed to be no grain of sense in the orders which he flashed by radio from end to end of the country: "All citizens must keep to their homes! Doors and windows must be closed, and sealed as securely as possible. All warm clothes, fur coats, blankets, etc., must be taken from garrets and dust-heaps, so far as such relics survive from pre-weather-adjudication days. Such antiques as stoves, furnaces, and gas and electric heaters should be salvaged from junk piles and museums and put into operation. This must all be done immediately. It is indispensable for the national welfare."

Considering that the month was July and the temperature without artificial cooling would have been in the neighborhood of ninety, this order was suffi-

cient to make many heads shake questioningly, even in a country whose people had been trained to let their ruler do all their thinking for them. But the Nesbians had long ago learned the un-wisdom of disobedience; and, though there was much secret grumbling, they began dutifully to rummage about for such antedeluvian articles as overcoats, sweaters and stoves.

Those who held to the view that their dictator had grown childish with age were to find new support for this conclusion during the following day or two. Although the combined Vestubian-Transvanian troops were already at the border, the defending army had not been given the word to march. The forts had not been manned; the approaching legions were not being harried by airplane attack, nor even by stray bands of skirmishers; bridges in their path had not been blown up, nor roads destroyed; they were attacked neither by mines, nor by artillery, nor by tanks. What was the matter with Strumpf and his advisers? Did they propose to let the enemy take the country and never so much as lift a hand in its defense? So, at least, it appeared to foreign observers as the approaching regiments crossed the frontier and pressed unmolested into Nesbian territory. It seemed that Strumpf, for all his bluster, would sooner surrender without a struggle than take the chance of being blown to bits in an assault against superior forces.

Never had a victory been more bloodless. Mile after mile the advancing troops pressed along unoccupied roads and through towns apparently emptied of every inhabitant. In their jubilation, the leaders did not seem to suspect a stratagem—for what ruse was there which, in open country, could entrap a fully equipped army hundreds of thousands strong?

Not until the Vestubians were approaching the Nesbian capital did the

first ill omen appear. Already a concentration of half a million invaders were occupying positions two hundred miles from their own border; their big guns had been brought within range of Nesbia's principal city; and on the morrow, it was believed, the conquest would be completed, even though resistance should at last be offered by the hitherto passive Nesbians. But it was just at about this time—in fact, exactly at noon on the memorable thirteenth of July, 2053—that the invaders noticed the first ominous sign.

Suddenly an unseasonable coolness was noted in the air. Men began to shiver, although a bright sun was high in the heavens; a penetrating chill, rapidly deepening, spread all about them and made their thin summer garments seem like capes of gossamer. The teeth of the invaders began to chatter; their breath formed frosty trails in the air; their hands became blue and numb, and even violent exercise did not suffice to keep them warm. Within an hour or two, ice commenced to form on the surface of ponds and puddles; within three hours, a fine snow was falling, and the lakes were encrusted deeply enough for skating; before evening, the leaves on the shrubs and trees were withering, dead birds and insects had fallen on every side, and the landscape bore an aspect of wintry desolation. Down, down, down went the thermometer; down toward zero; then below zero—ten degrees, twenty degrees, thirty degrees, forty degrees, fifty degrees below zero.

It was in vain that the invaders attempted to defend themselves by lighting fires; in vain that they sought shelter by breaking into the few houses and buildings that were at hand. Against the frightful cold, only the stoutest fur clothing would have been of any avail; a wood fire was as useless as a splinter would be to check an avalanche; and all the accessible places of shelter

would not hold one man out of a hundred in the stampeding army. . . . Horrible stories have been told by survivors of that calamitous day: how men, their blood thinned by the summer heat, dashed about like panic-stricken cattle; how they dug themselves into the ground, huddled together in hollow tree trunks, and fell by the thousand, like autumn-stricken flies, amid the ice and the snow. . . . For the vast majority, there was no hope; a few minutes' exposure to that devastating cold would freeze a man solid. Never in all history had an army met with swifter disaster; when the next day dawned, with a temperature fast rising toward the normal, a few thousand miserable survivors, crowded together in barns and stables with frost-bitten toes and fingers, and ears and noses nipped off by the cold, were all that remained of the invading forces.

V

ONCE more Chancellor Strumpf ranged the palace floor. His eyes were gleaming; he was rubbing his hands together in self-congratulation. "Doctor Hurovi," he exclaimed, jubilantly, "I'll have you knighted for this. I never thought it was in you. Why, you're the greatest military genius in history. You've won the most remarkable victory on record—and without firing a single shell."

"It wasn't I that did it, Your Excellency," denied the meteorologist, his eyes modestly downcast. "It was the Weather Adjudicator. You see, the idea came to me—why not put on our reserve refrigerating power, and suddenly run the temperature down? I really didn't anticipate quite how effec-

tive it would be."

"It was better than poison gas!" the Dictator went on, enthusiastically. "Of course, I don't say there weren't some minor disadvantages. Our crops were all destroyed; trees and bushes everywhere were ruined; I don't think there's a single green thing left anywhere in Nesbia. Besides, whole flocks of cattle and sheep were frozen."

"A few thousand of our countrymen, also," added Dr. Hurovi. "There were many, I understand, who didn't protect themselves sufficiently—"

"Silence!" enjoined the Dictator, putting up a forbidding hand. "Don't let it ever be mentioned. Such little—h'm, such little annoyances must be expected in every war."

After a moment Strumpf went on, with a smile, "There's just another little thing, Doctor Hurovi. You know the counter-revolutionary movement was getting so strong it was beginning to worry me. An outbreak was planned for next month, on the 'Save our weather!' program—and so many were involved that we'd have had the devil's own time putting it down. But just this morning I had encouraging news from the Minister of Espionage. He informs me that the rebellion has collapsed. The rebels, he says, are now convinced that I did not really mean the Weather Adjudicator to control the climate at all. This was only camouflage. It was planned from the beginning to be a military weapon!"

Such apparently was the view in foreign countries as well. Before the year was over, seventeen leading nations had voted funds to install Doctor Hurovi's system of climate control. It was universally believed that, as a means of regulating the weather, the scheme was a failure, but that, as a defensive weapon in wartime, it would soon make all battleships and air-fleets obsolete.

ATLANTROPA—THE IMPROVED CONTINENT

A Daring Hint to Land-Grabbing, War-Crazy Europe, in This

Sensational Article by WILLY LEY

A POLITICAL commentator recently termed the Strait of Gibraltar the "Gate to the Sea of Destiny."

It is very possible that this poetic term is actually a prophetic term. The Mediterranean Sea might well become a "Sea of Destiny" for the nations of Europe, if they should find a way to unite—not politically which is not to be expected, but economically—to meet the problems that will face them only a few decades hence. It is not a great novelty if one states that Europe needs room for expansion. But it is a novelty how this expansion might be accomplished.

Professor Hermann Soergel of Munich, a broadminded economist with ambitions that expand into the realm of the engineering sciences, has recently published a number of suggestions that were shocking on account of their magnitude as well as of their feasibility. It is nothing less than a new and improved continent which he proposes, a continent he wishes to be termed Atlantropa.

Atlantropa, etymologically a combination of Atlantis and Europa, is to be a very tangible actual combination of Africa and Europe, achieved by means of a solid wall from Southwest Spain to the vicinity of Africa's Atlas mountains. It is a wall to close the gate to the Mediterranean Sea, a dam across the Strait of Gibraltar.

The purpose of such a dam becomes obvious if one knows that the Strait of Gibraltar is not only the gate to the largest inland sea on Earth but also its very means of existence. If the Strait of Gibraltar did not exist the Mediterranean Sea would soon cease to be. Not less than 100,000 cubic yards of water flow every second from the Atlantic

Ocean through the Strait of Gibraltar into the Mediterranean Sea to maintain its level.

The Mediterranean Sea has a large surface and consequently tremendous quantities of water evaporate every second since this Sea, around which our recorded history began, has a warm and sometimes even hot climate. The rivers that flow into this Sea are not very numerous and none of them is overly large (—Ebro, Rhone, Po and Nile are the four largest of them—) therefore they do not furnish the amount of water that evaporates from the Sea. Actually these rivers and the rain that falls over the Mediterranean fail to compensate evaporation losses by about 100,000 cubic yards per second, about the amount that flows through the Strait of Gibraltar. The Atlantic Ocean furnishes the water lost in the Mediterranean and it is large enough not to be seriously or even noticeably affected by this tremendous amount.

But if an earthquake were to close the Strait of Gibraltar, the level of the Mediterranean Sea would drop steadily until a status of balance is reached. This status of balance would require that the area of the sea is reduced to about half of its present size so that the other half would become dry and probably habitable land.

Geologists believe, by the way, that this status once prevailed; the Strait of Gibraltar is probably not more than 50,000 years old. If it should be true that it opened suddenly—as certain signs seem to indicate—the flooding of the Mediterranean depression must have been a catastrophe which would explain all the myths and legends of the great flood. If the Strait of Gibraltar should close with equal suddenness the level of the Mediterranean Sea

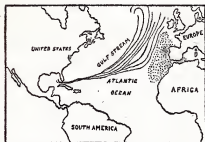


Map Showing the Land Areas That Would Appear if the Level of the Mediterranean Sea Would Drop 220 Yards

would at once start to recede at the rate of about five feet two inches per year.¹

Hermann Soergel's plan is easy to understand if one knows these facts. To raise several hundred thousands of square miles of land from the bottom of

and into the receding Mediterranean Sea is a project of tremendous proportions. But he is also well aware of the fact that there are no impossible tasks involved. Since it would be useful to dam the Dardanelles on the other side of the Mediterranean Sea too, it would be wise to start the project at this point. The flow through the Dardanelles amounts to less than ten per cent of the flow through the Strait of Gibraltar and since this strait would continue to function as an infill valve during the work at the Dardanelles no pressure difference would hamper the work on the first dam. At the same time valuable experience could be gathered during



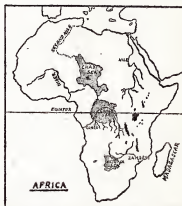
Soergel's Own Sketch of Gulf Stream and Mediterranean "Cold Water Cushion." (Dotted Area Comparatively Cold Water.)

the sea, to produce about 160 million HP of electric power, to strengthen the connection between Africa and Europe, to achieve a million other things one only has to dam the Strait of Gibraltar solidly.

Professor Soergel knows perfectly well that a dam that prevents the Atlantic Ocean from pouring a hundred thousand cubic yards of water per sec-

¹ The loss amounts to about 4150 cubic kilometers per year which is compensated as follows:

Atlantic Ocean	...2760 cubic kilometers
Black Sea 150 cubic kilometers
Rivers 230 cubic kilometers
Rain1010 cubic kilometers



How the Map of Africa Would Look if Its Water Conditions Were Changed According to Hermann Soergel's Plans

this work before the more difficult job at Gibraltar is actually started.

THE Dam of Gibraltar should not cross the Strait at its narrowest point because it is there more than 550 yards deep. Soergel wants to build the dam between Tanger in Africa and Tarifa on the European side. It should follow a line of submerged reefs and shallow spots so that the greatest depth encountered would be only about 350 yards. The dam, arching out into the Atlantic Ocean in a wide loop would have to be about 500 yards thick at the bottom and about 50 yards at the top to withstand the terrific pressure of the water of the Ocean. There would be no flood gates because they would tend to weaken the dam.

On either side two mighty canals would lead from the Atlantic coast to the Mediterranean. One on each side would consist of a series of gigantic locks, admitting even large liners. The other two canals would lead the water to two huge water power plants, each capable of generating 80 million HP. Similar canals and similar power plants—only on a much smaller scale—would be installed at the Dardanelles.

The calculations used in Soergel's plan are based on the assumption that there would be a level difference between Atlantic and Mediterranean of 200 meters (220 yards). To obtain this difference, Soergel wants to operate his power plants only on a very small scale until the level of the Mediterranean Sea has dropped by 220 yards. Then he wants to re-establish full compensation for the then occurring evaporation losses of the Mediterranean Sea again but to maintain the difference in level and to utilize every ounce of Atlantic water for the generation of power.

The plan, which had been termed "Atlantropa Plan" by Soergel himself caused much astonishment and surprise

when it was published a few years ago. Everybody realized at once that it opened tremendous possibilities, but everybody also realized at once the obstacles to be overcome. The smallest of them are those that are purely technical. It is true that a dam of this size—it would have to be about 20 miles long—cannot be actually constructed with present day methods. But there is no doubt that the technique of building it could be worked out. There is also no doubt that the necessary changes at the mouth of the rivers and of the Suez Canal could be effected without much difficulty. There is also no doubt that the necessary gigantic locks and the tremendously large water turbines and dynamos could be built.

But there are very many other doubts. A large number of Mediterranean harbors—practically every harbor at the shores of all the countries bordering the Mediterranean Sea—would become obsolete. Almost every one of them would be many miles inland as soon as the Dam of Gibraltar is closed and the waters of the Atlantic Ocean separated from the Mediterranean. This would mean financial losses of a magnitude that cannot even be estimated. On the other hand it is certain that the gains would be so immense and so manifold that even these losses might be hardly noticeable. There is a more serious objection, however. The bottom of the Mediterranean Sea seems to be actively volcanic. It is likely that the volcanic activity would decrease very much as soon as the weight of the water is removed.

The main objections, however, are of political nature. As long as Europe is not politically, or at least commercially united there is no hope of even seriously considering the Atlantropa Plan. Soergel knows very well, of course, that under present political conditions no government and no business organiza-

tion would dare to take steps towards its realization. The world in general and Europe in particular will have to change very much politically until mankind may start changing its planet geographically.

However, Soergel does not stop pointing out to the European nations that the adoption of his project would benefit even those countries that do not have direct access to the Mediterranean Sea and consequently would have no share in the new land and its products.

It is true that the Dam of Gibraltar would change the climate of Northern Europe in a favorable way.

As everybody knows England, Northern France, the Netherlands, Northern Germany and even the Scandinavian countries benefit tremendously from the American warmth brought to their shores by the waters of the Gulf Stream. It is not so well known, however, that a great deal of warm Gulf Stream water is spent "uselessly" in the Northern Atlantic, west of Ireland. To exert all its beneficial power on the Northern parts of Europe the Gulf Stream should flow a little more toward the East than it actually does.

THERE have been several plans proposed to influence the course of the Gulf Stream, they were either phantastic or futile, usually phantastic and futile. These plans tried to change the direction of the Gulf Stream near its source, preferably while it passes south of Florida's Keys. That they would have failed to work even if they had been more intelligently planned was not known until recently. Scientists that investigated the data gathered about the flow of the Gulf Stream on the European side learned to their surprise that it is the Mediterranean that prevents the Gulf Stream from reaching Europe more directly. In spite of the large inward flow of Atlantic water

through the Strait of Gibraltar there is a counter current of cold water near the bottom of the Strait. This counter current, spreading out far and wide as soon as it has passed the Strait, acts like a "protecting" cushion of cold water.

Assisted by Professor O. Jessen, an authority on the Strait of Gibraltar, Professor Soergel drew a sketch of prevailing conditions that shows clearly that the Gulf Stream would probably flow directly into the English Channel and thus into the North Sea, if only the Mediterranean would stop to send its cold bottom-waters into the Atlantic Ocean. A dam across the Strait, as proposed by Soergel for entirely different reasons would naturally prevent the Mediterranean from deflecting the course of the Gulf Stream. Thus climatic conditions for Europe would improve in general if the Atlantropa plan were realized.

While the possibilities and the feasibility of "Atlantropa" were still hotly discussed, Soergel published another and even more interesting plan. Progressing logically from one possibility to another he investigated what could be done to Africa with a few changes of water levels.

Africa and Australia are the two continents that are destined to receive the largest percentage of Earth's excess population during the next centuries *if they are able to support it*. Under present conditions they are not and the reasons are the same for both continents. Life needs warmth and water but in either case only the former is present. Africa as well as Australia have a sufficiently warm climate but neither of them can boast of really large bodies of water in its interior. As far as Africa is concerned this statement may sound surprising if one thinks of the large lakes of Inner Africa like Lake Victoria, Lake Nyassa and Lake Tanganyika. But it is nevertheless true.

The African lakes, large as they are, do not provide enough water for the whole continent, especially because they are all situated in East Africa, i. e., because they are comparatively close together.

The other parts of Africa, although they may boast mighty streams, do not possess large lakes. If Africa were to be populated extensively one might think of damming one or several of these large rivers in order to create artificial lakes of large size.

Fortunately conditions are very favorable and the technical difficulties are small. One of Africa's mightiest rivers, the Congo River, flows for more than half its entire length through a large depression of almost a million square kilometers in area. The solid mountain chains and plateaus surrounding the depression rise unbroken to about 1,500 feet above the bottom of the huge bowl. There is only one small outlet through which the Congo River winds its way to the Atlantic Ocean. If the river would be dammed at a certain point the large depression would slowly begin to be flooded until it would represent an immense lake. Actually it was a large lake once in prehistoric times before the river had managed to gnaw its way through the rocks obstructing its flow.

Needless to say that Soergel has made plans for such a dam. Needless to say also that he does not only plan a dam with which to better the Inner African climate but that his dam is to yield a large number of horsepower by means of water turbines and generators with which it is to be equipped. A level difference of fifteen hundred feet with a large body of water on top of this height cannot very well be overlooked by a power engineer.

But what will happen if the water manages to find another way out of the gigantic natural bowl? There is a point where such an event is likely to occur. North of the "Congo Bowl" there is a

second large depression, not as deep but of an even greater area than the Congo bowl. The deepest point of this depression is marked by Lake Chad. Lake Chad is without any connection with the ocean or any body of water, but it is still a large lake. Soergel now proposes to eliminate the danger of his "Congo Sea"—as he terms it—overflowing and bringing disaster to presumably populated areas by creating a high level outlet toward North near Ubangi. West of Ubangi there is a partial breach in the walls of the Congo bowl that is conveniently located.

THE water of the overflowing Congo bowl is to create a second large artificial inland "sea" in the Chad depression. Even if this also were filled to capacity there would still be a considerable difference between high water levels in both "seas." The surface of the Congo Sea would be about 300 feet higher above ocean-level than that of the Chad Sea. Therefore the Congo outlet involves a drop of about 300 feet of which at least 200 can be utilized for another power plant at the North Shore of the Congo Sea.

It is not very likely that the Chad depression will be rapidly filled to capacity, not only because most of the ground is now very dry but mainly because an increased surface means also increased evaporation. But if the Chad depression does not constitute a sufficiently large reservoir for the water of the Congo River and its tributaries the northern shore of the Chad Sea might be connected with the Mediterranean Sea in utilizing an number of smaller depressions. Thus a "Second Nile" would start from the Chad Sea and flow into the Gulf of Gabes of the Mediterranean Sea. The "Second Nile" would be somewhat larger than the actual river Nile and could be travelled upon by rather large ships so that many

places that are now inaccessible Inner Africa could be reached by ship directly.

Even a third large artificial inland sea is possible near the Victoria Falls of to-day. It would be filled by the Zambesi River that, although large, would need quite a number of years to fill this third large African depression. How much three large artificial lakes of the size indicated by these three natural depressions would change Africa's climate is almost impossible to imagine. One can only say that the changes will be beneficial; the whole continent will certainly become much

more habitable with a climate friendlier to the White race.

It is probably the second part of Hermann Soergel's Atlantropa plan, the project involving Africa alone, that may be started first. It has the advantage of requiring less labor and less capital expenditure, it hardly calls for new methods of construction and is blessed with fewer political complications. And if of the whole Atlantropa plan only the "Congo Sea" were actually accomplished it would mean nothing less than opening the gates of the Dark Continent for civilization and progress.



Test yourself on these questions. Answers and scoring points are given on page 126. In every case, tell *all* you can. For example, if the question were "What is an astronomic unit?" a 100% answer would be "A measure of stellar distances, equivalent to the mean distance of the Earth from the Sun, which is 92,900,000 miles." But a partial score would be allowed for *either* the definition or the approximate figure (within a range indicated in each case).

1. What are a mirage and an ephemeris?
2. Explain the similarity and the difference between a sextant and a theodolite.
3. What is a Wilson cloud chamber?
4. Identify siderites, aerolites, siderolites.
5. What is the proper motion of stars?
6. Give the four principal motions of the Earth and their rates of speed.
7. What is Bode's Law?
8. In what ways are alpha particles and protons similar and how do they differ?
9. What are dipter, helicopter, and dendroheliconometer?
10. Give the mean density, or specific gravity, of the Earth, the Sun, the planet with the greatest density, and the planet with the lowest.

(Answers to these questions on page 126.)

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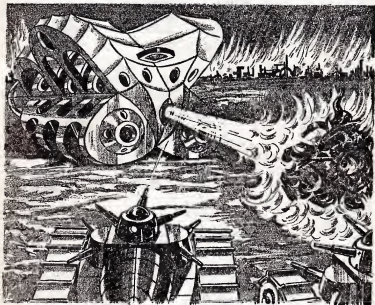
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THE SECOND MOON

By R. R. WINTERBOTHAM

Had his questings into astro-physical space doomed mankind? Was Roger Sage to blame for this annihilating scourge of flaming meteors?



The flame scored a direct hit, leaving only a twisted wreck

CHAPTER I

STACCATO BARKS and crackles, rumbling booms and sharp bangs dinned through the day—July 4, 1976—as the United States celebrated her second century of independence.

There were fire laws, traffic laws, life guards and parachutes to protect the celebrators, yet the usual penalties were drawn from those who used fireworks, motor cars, bathing beaches and airplanes. One hundred and seventy-five million people in the fifty states of the Union—including the two new ones, big Alaska and little Hawaii—

touched the fuse and let 'er buck, or cut the rope and let 'er explode, according to individual inclinations.

Europe, profoundly grave as nations stood heroically—in the estimation of each—amid an international crisis, tried to decide whether the time had arrived for another war. Inhabitants of European nations, poised for war, had time for a sidelong glance of non-comprehensive wonder at America's wanton bloodshed. Then, while Europe went to bed shaking its head, America settled down for an afternoon of popcorn, peanuts, baseball and firecrackers. Night fell in America and skyrockets swished to the heavens.

It was a gala Fourth of July.

Revelers from Parisian cafes, not knowing when the next war would start, had been making the best of it. It was shortly before dawn as these revelers were starting home in the traditional nondescript taxis of France when the heavens blazed forth with a display of fireworks *à la* American.

Monsieur F. Billiones, astronomer of the Academy, was aroused from a sound slumber by the jangling of his telephone.

"*Pardonez moi, M'sieur,*" came a voice, scented—even over the telephone, it seemed—strongly with *creme de menthe*, "your stars are behaving rather badly tonight. Or are we at war again?"

M. Billiones roundly upbraided the sleep disturber and hung up his telephone. Then, as he was about to return once more to bed, he glanced from his window.

"*Mon Dieu!*" he exclaimed, excitedly. "It was not *le liqueurs de Paris!* The meteors! The greatest shower since the Nineteenth Century!"

Balls of fire, trailing tails miles long were plaiding the heavens. Trembling with excitement, M. Billiones feverishly sat for forty-five minutes trying to plot the exact spot in the heavens from which the shooting stars came. In America they had machines that took pictures through a revolving fan that cut the trails of meteors twenty times per second, measuring their speed of flight. Several synchronized machines, placed miles apart, could give the exact location of the source of a meteor shower. But M. Billiones had no such machine. The wealth of France, invested in war machines, could contribute nothing for astronomical purposes.

Then the sun rose in the east to spoil the labors of the scientist.

"The source must be directly overhead. If there were only an hour or so

more of night—" M. Billiones paused. "Why of course! America! *Mais oui!* It is still night there."

The scientist thumbed through his files. He had the address of a young American who lived somewhere in the Mississippi valley, who had caused a stir in astronomical circles with a new theory on the origin of the solar system, involving a new phase of energy. The theory was calculated to replace the insufficient nebular hypothesis and the unwieldy star-collision guesswork.

This young American—his name was Roger Sage—had discovered a constant of mechanics now termed the Sage constant. Its mathematical value was .00000537, which had certain relationships with the speed of light, 186,000 miles per second; the FitzGerald contraction, and gravitation.*

Sage considered the repellent force of the sun's light sufficient at certain times to throw off clouds of highly ionized vapor, such as exist in the photosphere of the sun. Similar action is observed in the formation of comet's tails. The thinner the gas, the greater distance the cloud will be thrown. Intricate calculations show tidal and energetic forces which cause condensation

*Although only a few mathematicians are capable of wading through Sage's profound equations, Sage explained some of the simple phases of his discovery in a popular paper, published shortly after 1970 in *L'Appariteur Scientifique*, a Parisian mathematical journal. This paper probably first drew M. Billiones' attention to the young American. The paper compared the Sage constant of universal structure and other astrophysical constants. Sage pointed to the very close relationship of his own constant with the speed of light. Multiply the Sage constant, .00000537, by any given speed expressed in miles per second. The result will give the percentage of that speed to the speed of light. For instance, the percentage of ten miles per second to the speed of light will be $10 \times .00000537 = .0000537$.

of the gas to form planets and other solar satellites. The theory accounted for four planets of high density near the sun, and four other large planets of low density far from the sun. It did not account for Pluto, which was considered by Sage as an interstellar wanderer captured by the solar system and held as a planet. The high eccentricity of Pluto's orbit also bore out this explanation.

The theory, through quite involved methods of mathematics, also accounted for comets, asteroids, rings of Saturn and the moons of each planet, with the exception of the Earth. In the case of the Earth Sage showed that there should have been two moons, one comparable with the Earth in size and the other about the size of the existing satellite. This bothersome point tended to disprove the entire theory, because everyone knew the Earth had only one moon.

What had become of the other? Sage declared that there were two explanations: The first, that the second moon had been destroyed; the second, that the second moon was yet to be created. Like many men of science, Roger Sage had overlooked one point in his calculations. Neither explanation was correct, or entirely correct at that time.

M. Billiones was one of the scientists who had bitterly attacked young Sage's calculations. He had joined forces with other jealous European scientists who declared that nothing of scientific importance could come from savage America. It was in the form of a jealous hope that led Billiones to communicate with Sage regarding the meteors.

"How will the Sage constant deal with the meteors?" mused Billiones. "If it can account for a non-existent moon, surely it can account for meteors one can see."

BILLIONES grinned as he hoped that the simple little shooting stars would upset the theory that had caused this young upstart to steal the laurels of astrophysical philosophy from the whitened temples of the older men of science.

Without regard for cable tolls, M. Billiones wired Sage:

"We of France congratulate you of the United States. We hope the heavens may show an equal interest on July 14, 1989, the bicentennial of our nation's day of liberty. May it please you to fit the meteor shower, which now is celebrating your bicentennial, into your Sage* constant hypothesis? F. Billiones, A. S."

It was not yet eleven o'clock at night when Sage received the message. There were six hours of time difference between his locale on Earth and that of Paris. He looked out of his window, to the west of his vine covered cottage. He saw the meteors flashing in the sky. He shook his head sadly. Meteors visible in Paris should not be visible in the United States, unless the Earth was plowing through a vast swarm. His calculations accounted for no such swarm at the present spot in which the Earth stood in its travel around the sun.

Something at last had been found that failed to hinge upon the elementary structure of Roger Sage's mathematical equations.

CHAPTER II

SCIENCE UNDER FIRE

SUSAN THAYER spun her roadster up the cinder drive toward Roger Sage's cottage. It was unconventional for a young woman to call upon a young man—even her fiancé—at such a late hour. But she had observed the meteors. She sensed that

something was wrong with the universe; that something did not jibe with her sweetheart's theory. Roger would be deep in calculations, sweating over figures and arming himself to ward off the assault on his theory that was sure to greet him the following day. Too many scientists, especially that European clique led by Monsieur F. Billiones, would cheer at Roger's downfall.

Susan found Roger standing in his garden, looking upward into the heavens. He was not studying figures, only looking, seeing and sighing. His shoulders drooped in dejection. At the sound of her car he turned and watched her step from the machine.

"Hello, Susan," he said, with a wan smile.

"You've noticed them, I see," she answered. "Have you accounted for them? Do you know what they are?"

Roger sadly shook his head. "There's no use trying to fit them into the theory, Susan," he replied. "This is something unaccountable. They might come from outside space, but they would have been noticed before this. I'm afraid there will be one attack tomorrow I can't answer. Already I have received a cable from Monsieur Billiones in Paris. I've communicated with him and found that his calculations show the source to be a point directly over Paris. They appear to be coming from a similar point here. Ninety degrees of longitude should make some difference in the point of origin, should it not? Yet, there are the facts."

"But, Roger, your theory must account for them, somewhere. Have you taken up the energy phases? The meteors may not be solid. They may be manifestations of condensed solar energy."

Roger started. Susan had touched upon a delicate point in his theory, for, as yet, the world had not been fully in-

formed of the power in hyperga, the new energy type discovered by Roger Sage. He had developed it from experiments in radio. But Hyperga was different from radio. Radio beams of different wave lengths do not interfere with one another, except when the wave lengths are nearly the same, in which case a "beat" can be heard in a receiver. In the case of Hyperga waves, beats occur in many phases. Two widely separated wave lengths can produce beats, and in these beats Roger Sage discovered power that could shake mountains. By multiplying the beats he could build up a tremendous vibratory force. This force could be used to destroy matter. Then, by using a process of cutting down—dividing the beats—he could create energy far in excess of that used to produce the waves.

Roger at this point felt himself on the verge of a great discovery. Was it possible to *create* energy? If it were, the discovery would shake the foundations of science. Energy might be obtained at the cost of other forms of energy; or through the destruction of matter. But creation from nothing was against laws of physics.

"If my energy calculations are the explanation of the meteors, Susan," spoke Roger, "I prefer to be discredited. Hyperga is too powerful a weapon in war to be placed at the disposal of mankind."

"Perhaps the meteors are an optical illusion. The aurora, perhaps?"

Sage shook his head. "It is all perhaps, but hardly true. They are something not of the world that are striking the Earth. That M. Billiones and myself should see the phenomena directly overhead at two widely separated points on Earth is a clue. From this I must work toward a solution. But there may be things that cannot be explained without publicizing my hyperga discovery."

ROGER turned and went to his cottage. For several minutes he sat at his teletypewriter notifying observatories throughout the nation. In a few minutes came the replies.

The Harvard observatory scientists had been among the first to be notified. They had sat for two hours with eyes glued to their instruments. Their meteor tracing equipment placed the source directly overhead at Cambridge. At Mt. Palomar in California, scientists also reported the shower directly overhead.

Morning newspapers were going to press over the nation with headlines, eclipsing the tabulations of the Fourth of July death toll and the pending war scare in Europe, reporting:

FIREBALLS BAFFLE SCIENCE.

Across the seas came reports from Japanese astronomers in Tokyo. There too the meteors had been seen, but there was a slight divergence in the usual manifestation. While the meteors had appeared from directly overhead they all seemed now to be moving in one direction, toward the west.

At Vladivostok one Russian scientist observed them and wired Moscow:

"Meteors arising overhead are converging, like inverted funnel, toward the west."

Across Siberia the fiery trail was followed. It drew more to a point. It passed over the Russian steppes then suddenly vanished over the border of barren Estarkia, the militaristic, dictator ridden monarchy of the Balkans. When last seen by Soviet astronomers the train seemingly was converging on a single point within the borders of Estarkia.

Science sometimes is cautious and other times incautious with its beliefs. There are too many horrible examples of public ridicule and even martyrdom of scientists who have believed without

reserve and who spoke without tact. Pasteur was ridiculed by medical men of his day. Bruno was burned at the stake and Galileo escaped a similar fate only by denouncing his discoveries. The Wright brothers were forced to carry on their experiments in flying in secret at Kitty Hawk because of public ridicule of the idea that a machine could fly. Learned men scoffed at Columbus when the navigator said the world was round.

On the other hand, established science is too likely to consider its theories unshakable. The men who ridiculed Pasteur, Bruno, Galileo, the Wright brothers and Columbus lived to be ridiculed because they had been too incautious.

Monsieur Billiones, while he placed himself in the position of the scoffers when he assailed young Sage, was unwilling to become one of the scoffed by advancing his own theory.

"We don't know the explanation of the meteors as yet," he announced to a horde of Parisian journalists who stormed his door soon after he had cabled his last message to Roger Sage. "Speaking for myself, I am quite sure there is a logical explanation concerning the meteors and I am positive the explanation will discredit that young American, M. Sage, to the credit of European scientists. But until the facts are assembled there can be no definite announcement. Science must be cautious and exact, you know."

As cautious as M. Billiones asserted he was, Parisian newspapers were cocksure that the laurels of science would go to Europe and not to America when the explanation came. Monsieur Roger Sage in America was sadly befuddled, said the Parisian gazettes. M. Billiones felt he was on the right track and expected to announce his discoveries shortly.

In America, Sage locked himself in his laboratory, built near his cottage.

He was not at home to reporters until late in the afternoon. Then Susan unlocked the door and invited the journalists inside.

"Gentlemen," said Roger, "I am taking a responsibility on my shoulders that may destroy my career as a scientist. I am about to make a public assertion that will challenge my standing as an astrophysicist. I have prepared a written statement to prevent my being misquoted. If there is anything you wish to know, call me at any time, day or night, and I will gladly elucidate what I have written. Beyond that I can tell you nothing. There are things I dare not reveal."

EAGERLY the reporters accepted the slips of paper passed out by Susan. Then Sage slowly read his statement aloud:

"I am making this public announcement because I feel that the world of science is faced with an emergency. Upon science rests the responsibility of warning the world of an ominous threat to the peace of that world. Nations must prepare for the greatest crisis in history. Europe must forego its petty squabbles and unite with America to repel a menace.

"I believed, last night, when I first saw the streaks of fire in the heavens, that I was witnessing a spectacular meteoric display. The fireballs, as you called them, looked like meteors and there the analogy ended. They did not act like meteors. Reports from other parts of the world convinced me that no meteor shower could have hit the Earth from a spot directly overhead at any point on the Earth.

"Every observer who saw the shower, in Europe, Africa, North and South America, reported that it originated apparently from a point *directly overhead*. In Japan, however, reliable observers noticed that the meteors drifted to the westward. In Siberia the drift was more

pronounced and in Russia there was no doubt.

"In Europe a few scientists, headed by Monsieur F. Billiones, are attempting to use the phenomena to discredit my Sage constant theory. I will not admit defeat, although to explain the shower as a natural occurrence cannot be done.

"As you perhaps know my theory has failed once. It has forecast a second moon for the Earth. I worked over equations dealing with the second satellite in hopes of finding a clue to the meteor shower. But to my surprise, from the midst of my formulating came an explanation as to why the second moon has been lost. The second moon, according to my figures, should occupy the same space in the heavens that is occupied by the Earth. Naturally two objects cannot occupy the same place. One object, therefore, was thrust into hyperspace. This was the second moon.

"Gentlemen, we have a second moon, but it exists in another dimension. It is possible that the second moon, being about the same size as our Earth, may support living, intelligent creatures. The meteors witnessed last night and early this morning in all parts of the world came from hyperspace. But as I said their behavior was such that they could not be explained as natural phenomena. The behavior showed tampering with natural laws. The meteors were driven by creatures of intelligence and the flight was directed.

"Observers thought the meteors came from overhead, simply because they were witnessing a materialization from hyperspace. Billions of atoms coming from one dimension into another would appear to come from all directions. The billions of meteors observed over the Earth may have been but one materializing from another space. And last of all, gentlemen, it was not a meteor we saw, but a space ship."

CHAPTER III

THE INVADER

THE EYES of the reporters as they glanced at Sage were incredulous. One young man coughed, as if to conceal laughter.

"But, professor," said another, who maintained a serious face, "a day has passed since the meteor shower disappeared in the Balkans. No word has been received of the landing of invaders from another space."

"It would be nearly impossible for anything to happen in America that you young gentlemen would not hear about in a few hours," smiled Sage. "But Estarkia, a sparsely inhabited country filled with uneducated people, is different. It might take several days, even a week or two, for the proper investigation of such an occurrence in Estarkia. If the invader is hostile it is logical that his first step would be to shut off means of communication with other parts of the world. I would suggest that your editors get in touch with Estarkian correspondents at once and learn if there is anything unusual going on within the borders of that nation. Then, too, I would urge you to notify correspondents in Russia, Bohemia and other surrounding nations to keep their eyes open for refugees."

"Boloney!" blurted a reporter. "I don't believe a word of your statement, Dr. Sage. It's more like the fiction of H. G. Wells or Stanley Weinbaum."

"That's what the whole nation will be saying tomorrow," said Sage sadly. "But both those science fiction authors have been proven to be prophets of the future. And such a thing as I suggest *could* happen, you know. Anyhow, I felt it my duty to issue a warning."

A signal corps operator in Nugtaz, Estarkia, sat dreamily at his post. The Estarkian war games had been com-

pleted for this year and there was little activity in the military, save the constant preparations for the war that was about to break out in Europe.

Suddenly a small red light blinked on the panel before him. The radio operator touched a switch and an automatic tuner brought in a voice. "Nugtaz! Nugtaz! Calling Nugtaz!"

The operator tensed, then spoke into an instrument on the table before him.

"This is Nugtaz. Go ahead!"

"Get your commandant!" said the voice. "This is the operator at Ilota. We have urgent need of troops!"

"The commandant is in bed," replied the Nugtaz operator. "He left orders to disturb him only in case of a war. If it is a war, perhaps I can disturb him, but he will be very angry."

"It is not a war exactly, but it is worse. A race of devils has dropped from the sky. The devils are killing people in the village and driving the peasants from their farms and homes. To the west they are advancing toward us in a huge armored car!"

"My friend at Ilota, you are drunk! Very drunk! Go to bed and sleep it off!"

The little red light blinked off. The carrier wave stopped suddenly. It was strange. The operator had not expected his suggestion to be heeded so readily. Perhaps he had better call Ilota back to make sure.

The operator touched a switch. For several minutes he tried to raise the operator at Ilota. But no answer came.

"Perhaps something is wrong. Perhaps it is an invasion—a new weapon, perhaps. I shall call the commandant!"

The operator summoned an orderly. Within a few minutes the officer of the day had arrived and was receiving the operators report.

The officer scratched his head. "The troops are getting too soft," he said. "Perhaps some night work would help them. I'll send men to Ilota to arrest

that drunken radio operator. No need to disturb the commandant. This is mere police work. Sergeant!"

A small man bearing stripes on his arm entered the headquarters and saluted.

"Yes, sir!"

"Call out a cavalry detail—four armored cars. You take charge. Advance to Ilota and arrest a drunken radio operator who professes to have seen a race of devils invading the town."

"Yes, sir!" said the sergeant, saluting again and turning to go.

"And—sergeant—see that you take along plenty of ammunition!"

The sergeant raised his eyebrows and left.

Within thirty minutes, four pieces of motorized cavalry wheeled rapidly westward toward Ilota. Each armored car carried a driver, two machine gunners and a man to operate a one-pounder. In addition, Sergeant Ivan Icza sat in the fourth car with his eyes glued to the slit that ran across the front of the machine. His hand rested on a two-way radio unit.

Sleepy-eyed, the soldiers peered through observation ports at the starlighted hills. To the west was a greenish glow. The men grew uneasy at the sight. The Ilota lights had never burned green before.

Sergeant Icza nudged the driver of his car.

"Radio operator at Ilota claimed he was attacked by a race of devils," smiled the non-com. "Damned if I don't think the old goat of a captain half believed it."

THE driver smiled. One of the machine gunners behind the sergeant cackled loudly.

"Wipe it off!" growled Sergeant Icza. He could call the captain an old goat, but no buck private could laugh.

The cars approached a hill that separated them from Ilota. The sergeant

picked up the short wave microphone.

"Deploy!" he ordered. "No. 1 car form the point. Advance No. 1 close as possible to Ilota. If attacked, return fire and hold ground. The others will follow to your support. Report by radio whatever you see out of the ordinary."

"Yes, sir!" came a rasping voice from the loud speaker.

No. 1 car shot ahead while the other three machines formed a parallel line behind it.

The first car disappeared over the hilltop toward Ilota. The sergeant looked uneasily at the green glare above the hilltop.

"The city is burning!" snapped the voice from the radio. "Burning with green flames. Something—maybe devils, sir—has attacked the town."

"Hear that!" whispered the sergeant. "Just what I thought—devils!" He raised the microphone. "Continue toward the town. Report what you see."

"I see people on the road. They're not troops, but men and women fleeing from the city. Refugees!"

Sergeant Icza flipped a switch on his radio. Tersely he notified headquarters at Nugtaz. "Get the commandant out of bed!" roared the sergeant to headquarters. "This is war!"

The first refugees met the three tanks as they moved over the hilltop. Ahead waved the green flames that were consuming the city of Ilota. Limned before the flames were thousands of men and women, rushing like mad from the city. They were not all from Ilota. There were peasants from the country beyond. Devils? Sergeant Icza's lips curled disdainfully. Devils would not fight like this. This was the work of man. It was an invasion, war! There would be famine, bloody fighting, pestilence, corpses in the streets. Europe would be gloriously mad with bloodshed.

"Sergeant!" called the operator in car No. 1. "There's something advancing toward us. Looks like an egg-shaped tank—can't make out the nationality. It's a huge affair, probably fifty feet long. Sergeant! This is too big for us, what shall we do!"

"Stand your ground. Open fire if it comes closer!" ordered the sergeant. He wished that the old goat at Nugtaz had believed more than half what the Iloa operator reported. The sergeant wished the old goat had sent an army.

Once more the radio blared. The rasping voice of the operator broke into a shrill cry of terror. "Tune to 8.6 meters! They're trying to communicate!"

The sergeant flipped the tuner. A piping voice cackled into the loud speaker. It was a language strange to the sergeant who had heard many tongues spoken in his years of service. But there was no mistaking its meaning. Insistent, deadly, the voice demanded no resistance.

Feverishly the sergeant contacted headquarters.

"General alarm!" he shouted. "Invader advancing past Iloa. Refugees fleeing eastward."

As the sergeant spoke, the huge, egg-shaped tank spouted flame. It was a greenish flash that swept toward the No. 1 car. Dirt geysered skyward as an explosion rocked the armored vehicle. Then there was another spout of flame and a second terrific explosion as the flame scored a direct hit, hurling the car into a twisted wreck beside the road.

The three remaining cars opened fire as they wheeled about for a slow retreat. The sergeant had had enough. There was a third flash from the invader and No. 2 car was shattered.

"Hold 'em as long as we can!" muttered the sergeant into the microphone to the remaining No. 3 car. In his own machine the gunners were firing at the

enemy and the one pounder was banging fifteen times per minute. "Retreat slowly—"

Sergeant Icza never finished. Another flare of green flame swept over No. 4 machine. The sergeant, driver and gunners screamed as the entire world seemed to explode about them.

In No. 3 car, four men jumped from the door and ran to join the throng of retreating refugees. Behind them the egg-shaped tank slowly swung back toward the city of Iloa.

CHAPTER IV

OSCILLATION GEOMETRY

EUROPE was soon to suspect that something was rotten in Estarkia.

But the source of the putrefaction remained a mystery. Refugees streamed across borders, into Russia, Germany, Bohemia and Roumania. They told wild tales of a race of devils that annihilated entire cities with a burst of green flame. But the stories were too wild for general credence. Surrounding nations moved troops close to the Estarkian border and issued bulletins that a civil war was raging in the small Balkan state.

Reports were wirelessly and cabled to America and published beside Roger Sage's warning of an invader from hyperspace. The reaction was curiously unexpected. A nation laughed at Roger Sage. The greatest scientist of the age was declared crazy. Reports of disorder in Estarkia was nothing to be alarmed about. Estarkia always was having revolution. No one believed that an invader had attacked the Earth.

But Susan Thayer and Roger Sage read the reports of the disorders in Estarkia with concern. Quietly the two set to work building a weapon that was to utilize that strange creating and

destroying force, hyperga.

Two broadcasters were built, capable of utilizing certain wave bands of the force. By bringing the wave bands into close relationship, a multiplication of beats resulted and the result was destruction of matter. By moving the wave bands apart the effect was one of division—a decreasing ratio—that created energy. In one way the weapon could be used as a disintegrator. In another it could be used to build immense stores of power.

Roger perfected a device that could narrow the destructive energy to a tight beam that could be directed on any one spot. When he tried it he found that the action was like a sweeping green flame that pounded atoms into nothing.

"The invaders of Estarkia use a green flame as their weapon, Susan," said Roger Sage. "I have a suspicion—nay, more than a suspicion—a fear, that the men of the second moon know the secret of hyperga."

"I think, too—" began Susan. Her words were interrupted by a roar and a crash. Roger rushed from his laboratory into his garden. Smoking amid the flowers of the garden was a large metal ball. It was fully ten feet in diameter and as the two stood dumbfounded at the object, a section of the wall slid back. From the opening protruded a hideous, twisted body.

The creature bore some resemblance to man, but it was a suggestion rather than actuality. It was short, almost a dwarf, with a humped back, twisted facial features that were hardly human, and long, triple-jointed fingers. In one of its gnarled hands was a metal tube which he held menacingly toward Roger and Susan.

"Stand quietly," said the creature in perfectly enunciated English. Then he addressed Roger. "You are Roger Sage, the scientist?"

Roger ceased his stare and nodded.

"I am," he said. "And you?"

The creature laughed. "I am the invader from the second moon, which you so futilely warned against. I have come to repay an ancient debt."

"Debt?"

"Yes, a debt. You through your discovery of the Sage constant and the use of hyperga energy made our invasion of your space possible." The creature paused. He looked greedily at Susan. "The woman, who is she?"

"This is Miss Thayer, my assistant. She is quite essential to me and to my work. In fact," said Roger, "I could hardly have perfected my mathematical equations without her help."

The invader hesitated. "I should destroy her. But—" an oily, insinuating smile crept over his face. "—you like her, yes? Perhaps to save her from a very bad death you will do things for me? I am Exib, leader of the men from the second moon. I need your help, for my scientists do not understand all of the points of your theory. Unless you help them—" Exib looked at Susan in a way that conveyed his meaning.

The creature waved the tube toward the opening in the sphere. "Come!" he ordered.

Roger turned to Susan. "Shall we make a break for it?"

Susan shook her head. "It's not as bad as it seems, I think. I have faith in you, Roger. I know that you alone can do things that must be done right now."

Roger led her toward the door of the sphere.

The interior was barely furnished. Nearly all the inside was filled with machinery. Roger's eyes swept over bristling levers, control bars, dials and indicators. But in one corner was a human figure. A man, who stared at the two who entered.

"M. Billiones!" exclaimed Roger, recognizing the French scientist, whom

he had met on several international occasions.

Exib grinned. "Because he was so useful in discrediting you, Dr. Sage, we decided to save his life, too. You three of all mankind are to survive the destruction of the Earth." The moonman took his place beside the controls of the sphere. "This is the form of transportation used on Irti, which you have chosen to call the Earth's second moon. It can fly in the air or float on water."

EXIB touched a black-handled S-bar. There was a sudden jerk then the ball seemed to float through the air. Looking downward through the transparent floor, the prisoners could see the Earth pass beneath them in one continuous blur. A sob came from Billiones.

"To think, Dr. Sage, I was your enemy! I laughed at your ideas, while all the time you alone could have warned the world of this invasion! Now they will kill all men and colonize the Earth—"

"We don't want your Earth!" sneered Exib. "We are going to destroy it. We like our planet, but we are tired of conditions which make us exist in a weird space with sunshine, but without a sun; with strange forces that cannot be understood. We hope to move our own planet out of the hyperspace into your place in the solar system. To do this we must wipe out the Earth. Roger Sage's invention—hyperga—will make this possible."

"How did you know of hyperga?" asked Sage.

"Long ago the instability of our world led to certain scientific experiments that showed us our true position in the universe. We determined that our position was approaching a point at which no degree of stability can exist, even with our great machines, for a much longer time. Certain tensions

that created our position in hyperspace were increasing and had to be removed, but we could find no way to remove them.

"Then, about fifty years ago, we succeeded in tapping radio communications from the Earth. The radio waves pierced the barriers of hyperspace and once we had records of them, we learned your language and habits. We studied your science and found that the stability which besets us does not exist on your planet and that your planet occupies the place which ours rightly reserves to occupy."

"That is a matter of opinion," said Roger.

"It is the truth," snapped Exib. "Nevertheless, one day we heard Roger Sage's story of the Sage constant expounded by radio. We set our scientists to work on the problem. They succeeded in formulating the entire equation, even the points which Sage has never made public—the new phase of energy, hyperga, which is quite common in our own world. We use it in place of electricity."

"That! That's the answer! Hyperga is a manifestation of hyperspatial energy!" exclaimed Roger. "Why didn't I suspect it before?"

"Because, Mr. Sage, your science of oscillation geometry is very young. The idea of a three-dimensional object being given a fourth-dimension vibration probably has never occurred to you. However, I will give you credit for giving us the clue to interspatial travel. Your Sage constant permitted us to do that and it allowed us to formulate plans for the destruction of the world."

As Exib talked he directed the craft eastward. The craft was controlled by the long S-bar. The motor seemed to run on the principles of an electric motor, but Roger guessed that hyperga energy was used. The power came from a huge black box, undoubtedly

akin to a storage battery.

"We used only one machine to make the jump from Irti—our planet—to the Earth," Exib continued. "How we laughed at your consternation! You thought we were a meteor shower! Coming from our space to yours the craft appeared everywhere at once. Then it condensed over Estarkia. It was simple in explanation. It was like looking into ends of electric wires and seeing the generating plant."

Roger nodded. "I suspected it."

Exib went on: "At our place of refuge in Estarkia we have eliminated the population. A huge piece of machinery is being installed to rip the atoms of the Earth apart by hyperga destruction. But we cannot overcome a problem of wave length. That is why I need your help. If you aid me, I will spare your life, and that of your companions." Exib glanced at Susan.

"And if I refuse?" asked Roger.

"You will not refuse as long as the young woman is alive."

Roger left a reassuring squeeze of his hand from Susan. It told him more than words. As surely as if she had spoken she had communicated to him that she had faith in his ability as a scientist to outwit Exib and all of the super-brained hideosities of Irti.

"How can I help?" asked Roger quietly. In his mind existed a doubt.

CHAPTER V

EQUATION OF DESTRUCTION

EXIB brought the ship to the ground in a valley near the ruins of Ilota. The craft had traveled from America to Estarkia in less than an hour.

In the center of the valley was the huge machine which the moon-dwellers had used in traversing the dimensions.

It was nearly five hundred yards in length, lined with ports and studded with small projecting spines, which Roger recognized as hyperga repulsators.

Near the craft were two egg-shaped vehicles, something like a tank used in warfare. Further away was a deep excavation over which a metal framework was rising.

"That will be the point from which the disintegrating force will be applied on the Earth," explained Exib. "We have one hundred men working the machines for its construction and we will have it finished as soon as you determine the proper wave lengths for the destructive oscillations."

Exib led his captives inside the dimension traveler. Susan and Billiones were taken to comfortable quarters while Roger was led to a laboratory. On the wall of the room into which Roger was taken was a huge chart, covered with mathematical symbols.

"There, Dr. Sage," said Exib, "is the mathematical calculations as far as we have been able to take them."

Roger scanned the chart. The equation carried the Sage constant, represented by the symbol *S*. Another well-known constant used was the *I* constant, known in mathematics as the square root of minus 1. This constant theoretically represents the difference between time geometry and space geometry—a warning signal in any equation to look out for waves and oscillations. Two other abstractions in the equation, *X* and *Y*, represented the unknown wave lengths to be used in the destruction of the Earth.

The final summation on the chart was the equation:

$$S \times I^2 \cdot Y = Q.$$

"The only aid we can give you in solving the values for *X* and *Y* is the fact that we know that one of the values must represent one-half the distance between Irti and the Earth," ex-

plained Exib. "Since the two planets are in different dimensions we find it impossible to measure the distance."

"Why not try using the symbol .5," smiled Roger. "Then express the other unknown in terms of the distance between Irti and Earth?"

"Splendid, but try doing it," suggested Exib.

Roger smiled. He hoped to catch a slight error in the equation, something that had escaped the eyes of the scientists of Irti, but something which he hoped would save the Earth. Such an error did not appear, however.

"As you know," said Roger, "multiplication of wave forces of hyperga causes destruction of matter on the Earth, while division causes creation of energy. May I ask if this holds true on Irti?"

"Just the opposite," declared Exib. "On Irti multiplication causes creation of energy and division causes destruction. It has led us to believe that the creation of energy is simply the transformation of matter from the Earth's dimension, into energy on Irti's plane."

"I suspected as much," Roger nodded. "Therefore, if we wrote the equation: $S/X/I^2/Y$, it would mean not the destruction of Earth, but the destruction of Irti and all creatures of its spacial structure, including you on Earth?"

"Yes," agreed Exib, "for although we exist in your dimension, our bodies are attuned to hyperspace and a reversing of the processes would destroy us, providing of course the correct wave lengths were used. But you need not plan our destruction, Dr. Sage. You will be watched carefully and your mathematics will be studied by our greatest minds."

During the days that followed the prisoners were allowed to see each other only at meal times. Susan, somehow, had managed to keep her spirits buoyant, while Billiones remained in the

depths of despair.

"You are responsible for this, Roger Sage," said the French scientist. "Your dabbling with unknown spacial mathematics brought these monsters."

"If it had not been I, it probably would have been you or someone else who discovered the Sage constant, M'sieur," said Roger. "After all, how much credit should a man receive for discovering something? Columbus discovered America and all Americans and the world are indebted to him. But the time was ripe for such a discovery. A score of others planned a similar voyage—Cabot of England made such a trip. So if it had not been Columbus who traversed the Atlantic it would have been someone else."

"The same might be said for Lindbergh. He was the first, but there were others who saw him off who were planning the same trip from New York to Paris. Had Lindbergh failed, another would have won the glory and the world would not have been changed greatly."

"You are depreciating their efforts!"

"Not at all. Such men deserve recognition, but it is manifestly unfair to others, tried and tested and found to be of similar greatness, that the single discoverer should receive all the glory. Every hero's success lies on a foundation of other men's work."

"Get us out of here," moaned Billiones, "and you can have the floral offerings."

BILLIONES was drawing figures on the tablecloth with his pencil as they talked. At first he drew triangles, then he drew squares, then a row of crosses. Finally he put a row of figures across the table and abstractly multiplied them. Roger watched him closely. Suddenly the American let out a whoop of joy. He seized the tablecloth and jerked it from beneath the dishes.

"There!" cried Roger. "That is an illustration of my point. Without even thinking, M'sieur Billiones, you have saved the world!"

"If? Wh-what have I done?"

"You have solved a difficult irreversible equation," smiled Roger. "We Americans call abstract scribbling such as you have been doing, 'doodling.' It is a common habit, but psychologists make a great deal of it, and have even gone so far as to classify various types of doodlers. You have solved the equation and you have saved the world, but you don't know what you have done."

Roger paused and lifted his hand for silence. Hastily he concealed the tablecloth. The sound of footsteps told them that Exib was coming.

CHAPTER VI

THE EQUATION

EXIB led Roger back to the laboratory. "Our machines are perfected," he announced. "Now we need the translation of the unknown factor Y, or our equation, into a numerical value. For X, we have assigned .5, as you have suggested. You will go to work at once, but no tricks. Every figure will be examined carefully."

Roger smiled. "I have the value of Y," he said quietly. "The value of Y is two!"

"Let me see!" Exib motioned toward the chart. Roger quickly wrote down the following two equations:

$S \cdot X \cdot P^2 \cdot Y = Q$ (Where Q means the destruction of the Earth).

$.00000537 \cdot .5 \cdot -1 \cdot 2 = Q.$

"What is the numerical value of Q?" asked Exib.

"The value," smiled Roger, "is the negative Sage constant, $-.00000537.$ "

The moon-man nodded. "The two

wave lengths modified by gravitational and wave constants result in destruction of the Earth if multiplied."

Roger's lips moved slightly as he muttered something about division. But Exib did not hear. He stepped to a panel and turned on a switch. The indicator on a dial crept upward. When it reached a stationary point, Exib turned to a dial and began twisting it nervously.

"The Sage constant," he hissed. "Value, .00000537!"

Roger interrupted. "Of course you have taken precautions for the safety of we three human beings?"

"The ship will act as a shield," said Exib. "It is impervious to everything but the oscillatory geometrics that would destroy Irti." The motors in the room were screaming. Exib twisted the dial again. "Multiply the first wave length—value .5. Result, .000002685. Next the imaginary constant—the square root of minus one, squared—value, minus one. Multiplied by .000002685. Result, minus .000002685." The motors reached a higher note. The air seemed charged with tension. "The final step. The second wave length, Y, value 2, multiplied by the result of the last operation, minus .000002685. Result, minus—"

The thunder of a thousand storms shook the universe. There was a whirl of dust, a burning stench, screams of the Irti men. Roger closed his eyes. Then, suddenly as the noise arose, it quieted. The American opened his eyes. He was standing in a peaceful valley near a deep excavation. The dimension traveler, the disintegrating machinery, all of the machines of Irti had vanished.

"Roger!" came Susan's voice faintly. "Wh-what happened?"

The scientist turned. Nearby were his fellow captives, M. Billiones and Susan.

"M'sieur," smiled Roger. "Let me

congratulate you. You saved the world. It was not the method of calculating—multiplication or division—that counted. But the final result. In the case of that equation the final result would have been the same, whether the numbers were multiplied or divided.”

“I do not understand.” M. Billiones stared at the American.

“The tablecloth?” asked Roger. “Of course, it was destroyed. But never mind—” He wrote with a stick on the ground.

$$.00000537 \times 5 \times (-1) \times 2 = -.00000537$$

“Now we divide:”

$$(A) \frac{.00000537}{.5} = .00001074$$

$$(B) \frac{.00001074}{-1} = -.00001074$$

$$(C) \frac{-.00001074}{2} = -.00000537.$$

“In both cases the answer is the same—the negative Sage constant. The negative sign indicated energy and I was certain energy would be created, not destruction of matter. In the creation of energy Irti and all dwellers of that planet were destroyed.”

“But how—how did I solve that problem?” asked Billiones.

“Abstractly you wrote down the following four figures—3, 2, 1, $\frac{1}{2}$. Then you multiplied the four, your answer was three; you divided the four, your answer still was three.”

“Why?” asked Susan.

“Because two times one times one-

half is the same as saying one times one. And two divided by one divided by one-half is the same as saying one divided by one is one. By substituting my Sage constant for the number 3, I had practically the same equation you had written on the tablecloth.”

In the distance came the sound of a bugle. Then, over the hilltop, advanced a party of soldiers from Nugtaz.

Susan frantically waved her white handkerchief. The warlike maneuvers halted and the captain rode forward.

“Where is the enemy?” asked the captain in broken English.

Roger smiled and nodded toward M. Billiones. “Thanks to my friend’s doodling—”

“What?”

“Doodling, a type of abstract mathematics. We have wiped out the enemy as a result.”

“Ah! Signor Doodle! I am honored to meet such a hero!” said the captain with a bow.

M. Billiones looked toward Roger Sage. The French scientist smiled in his glory. No longer was he jealous of the American mathematician. Men of science are forgotten, but national and international heroes live forever.

“I love you like a brother, Roger Sage!” said M. Billiones.

But Roger was not interested then in the Frenchman’s adoration. At that moment Roger was thinking of Susan and not by any means in a brotherly fashion.



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BEYOND VAST CONCEPT

By HAL REMSON

Only one thousand million millionth of the universe was adapted to life as those four earth-creatures knew it—and their tiny hermetical space-ship was hopelessly adrift in an infinite void!

"VAST beyond concept," old Thorin Matson was saying. "So vast that even the ancient Einstein's laws wouldn't admit of its existence. Such a mass would warp light back to its own surface by reason of gravitational attraction, would warp itself out of space."

"And yet," I said eagerly, "there is a ray of hope."

"Yes, a ray of hope, intangible and ephemeral," agreed the old scientist. He stood before the space porte, and for a moment he seemed incredibly weary, incredibly ancient. His face was leathery and wrinkled, and the purplish toga-like garment fell back across his withered frame. The girl came and placed his arm about her almost unnoticed. She was slender, a diaphanous creature with ovoid features and large ecru eyes with the tint of ancient earth's skies.

"The void is so large, so apparently infinite," she said, possessed of a quiet awe as she stared into the starry firmament. "It seems never to get nearer, though we rush toward Orion at an incredible speed. And it seems that such a tiny part of the great universe is fitted for our life—for human life. It is so strange that only a thousand million millionth of the universe is adapted to

life as we know it, and our search for such a tiny portion of the cosmos appears so futile."

"Futile," I amended. "But necessary."

Old Thorin Matson nodded his head.

"Yes," he agreed wearily. "For that tiny fragment we know will soon be unsuitable. And life must go on, must surge somewhere—somewhere out in that vast space."



There was one other in that tiny hermetical space flyer, bulleting across space to the distant stars in a search that seemed as hopeless as the hunt for the proverbial needle in the haystack. One other, whom I had grown to detest. But perhaps, even as Thorin

Matson had said, my judgment was tainted with jealousy.

For there was more than casual admiration that glittered in the eyes of the flaming-haired giant who occupied the pilot's station before the embanked instruments, more than friendliness when the rust-hued eyes turned with increasing frequency toward the slender form of the woman who had insisted that her place was to accompany her father in the blind, almost hopeless, search for some other fragment of that thousand million millionth of the universe adaptable for human life.

A few centuries ago we of earth had known no fear. Then in the year 3046 it was discovered that the solar system would soon become uninhabitable for life as we know it.

Briefly, the trouble was this: the sun was contracting, and as it contracted it was growing hotter, had therefore become brighter as it diminished. The rate of expending energy had increased enormously due to added heat on the atoms. For it was suddenly discovered that Sol was no dwarf star, with a diminishing heat as heretofore supposed, but was in reality a "Giant" star, and as yet in the early stage of a sun's evolution, during which the heat would gradually increase to the maximum temperature of 36,000° Fahrenheit, at which point life would be impossible on any of the encircling planets.

A few centuries remained, at the most, during which the solar worlds would be baked to a crisp. And there remained but a scant thousand million millionth of the universe, in which to hope for sanctuary. Futile indeed had their flight seemed, heading out across great space in search of such a pitifully small zone, and yet old Thorin Matson had expressed certain confidence in his mass-calculations and astral balance-ments. The universe itself was weighed, with his mind drawing it down to a fulcrum expressed in symbols and mathematics, and in the end he had felt sure that some chance lay ahead in a great concentration of mass energy, lying somewhere around the vicinity of the constellation, Orion.

THE red-haired pilot had left his post.

He was creeping forward, his nostrils inhaling the purified atmosphere seeping from the tank decks, and curiously enough he resembled a crouched beast, preparing to spring, as I saw him from the corner of my eye.

Instinctively I braced to meet his

charge. His compact body was packed tightly into the argent space suiting. At his hip the carved holster of a ray-gun projected.

But his leer did not portend immediate menace. There was an odd expression deep within the brown-flecked eyes.

"Something wrong," he said, addressing Thorin Matson. "Some great pull exerting—"

Thorin turned, his brow clearing miraculously.

"Then I was not wrong in my solutions!" he exclaimed. "We're feeling the mass pull, already, Ran Striver! But this mass aggregation may be invisible, may warp light rays and space back around it. You realize that, Ran?"

I nodded, for his eyes were eager and dancing as he glanced toward me, suddenly elated. Elan stood and faced me, her hair streaming back upon her shoulders, dark and lustrous as the black nebula of the Dark Horse Nebula, visible through the transparent space porte in the upper corner. That single look caught my breath, for we had hoped so desperately that we might find some portion of the universe capable of sustaining life, where we might look forward into the future—together. Then—her eyes were gleaming like stars.

Came a scream of wrenching metal, a shriek of groaning levers. The space ship lurched unevenly, and I saw the mechanisms writhing.

"My God, Flare!" I shouted hoarsely. "You left the mechanisms at idle. And the attraction of whatever pull we've encountered. . . ."

I shot a condemning glare in his direction. Rage flared, spontaneously, unreasoningly, in his huge reddish features. His narrow eyes gleamed menacingly, and he made no move to seize the jerking controls. I caught a glimpse of a dark spherical body, lurching up from out of the unseen void, blotting

out the stars.

"Thank the Eternal Creator!" I gritted between set teeth "There's a dark world there below. An out-of-the-way planet. We'll have a chance to moor it, till we repair the damage."

The oblate sphere of opacity grew larger, gradually encompassed the abyss, and soon we were floating unsteadily over a rugged surface, with only the light of flickering Betelgeuse, one of the larger stars in the Orion constellation, to light deep gorges and bottomless chasms. Elan clutched my shoulder with a soft hand and pointed downward. Past her smoothly gleaming arm, covered lustrously with amber vitrisheen, I stared, viewing a bowl-shaped depression in the black terrain. The spacer responded cumbrously, then settled in a lopsided fashion.

And of a sudden I realized we'd landed squarely in a wasp's nest. From numerous black grottos in the hemispherical walls that hemmed us in, great bulbous heads were peering, and crystalline orbs were concentrated upon us in a steady, malignant stare. As we made further observations, the great pod-heads were followed by tremendous saw-toothed pinchers. Toad-like bodies followed, with lower web-toed extremities that carried these monstrosities forward in a repulsive, wobbly form of propulsion.

"Life, of a sort, exists here," said Thorin Matson, striving to hide the tremulousness of his voice, though his features were blanched and waxen. "But not as we know it. I've taken an air test, and it's poisonous, not to say non-supportive of vegetable life, which alone would make it unsuitable for immigration. Those creatures are some sort of acidulous reaction, resulting from alien chemicals."

"Let's hope they don't get the wild idea of trying to tear us apart," I said grimly, though icy hands were clutch-

ing at my heart, "for we'll have to get on some space togs, and go outside the space-ship with a torch and force-driver. One of the rear exhausts has split its sheathing. Elan, you must stay inside the ship, to be ready at the controls."

"I'm going with you," she answered decisively. "You know we couldn't raise the spacer off of this surface, crippled as it is, anyway. We'd better hurry as it is, for our hosts are losing their first fear of our ship."

In space togs, looking somewhat like curious larvæ, we left the airlock, carrying power-drivers and torches. Aside from that, we were each armed with ray-guns and short knives.

HOW unreal, how terrible were those moments, as we gathered at the huge rent in the outer hull. The clanging of the power-drivers against protesting metal, the white-hot heat of molten metal driven across the riven splices, served to keep the unearthly horde of monsters at their distance.

Flare's traitorous attack was quite unexpected. The last seam was bending reluctantly into place, when without warning he dealt Matson a terrific blow across the body that felled him instantly, and came lurching toward me. Elan screamed a warning. Stark insanity glittered in his rolling eyes.

His clenched, gauntleted fist struck the glassite panel of my visor, and I rocked backward, barely able to stumble away from the molten ribbon of metal on the exterior of the scarred, spindular hull. I'd never trusted him, had never really believed that he was sincere in altruistic motive when he wanted to accompany us.

Again he charged, like a locoed animal. Beyond that panel of his helmet I saw bulging eyes. A frothing mouth. I stepped aside, managed to avoid the main momentum of his charge. Struck

him across the chest. He staggered on, gained his balance. Before I could understand his change of tactics, he dived toward Elan.

It was then that I detected a faint crack along the edge of his helmet, a tiny crooked line. Abruptly I knew. His was no inherent insanity. Rather, he had been too hasty in donning his space paraphernalia. A crooked thread in the screw-piece on the neck had allowed a tiny wisp of outside atmosphere into the helmet. He had sucked it into a nostril. Up into his brain. Noxious vapors had robbed him of sanity.

Lurching forward swiftly, I thrust forth a steel-ribbed boot. He fell to all fours, and kept crawling toward Elan in the manner of a dazed animal of the jungle. She stood trembling in a paralysis of horror.

I jerked out the ray-gun then. The vibrating convolutions of my shot lashed across space. Burned through the verilumin space toggling. He crumbled awkwardly, lay in a motionless heap.

"Elan!" I shouted. "Those planet devils! Look! Our struggle has excited them, has aroused their worst qualities."

Heavy padded feet that might have weighed half a ton pounded the earth with such terrific force that the terrain shuddered and rolled. Mastodonic shark-toothed pinchers snapped up into the illumination of the Betelgeuse-lighted sky. A phosphorescent exudation gave them the appearance of gigantic ogres, leaping down the inclines toward us. I remember distinctly that the Dark Horse Nebula was clustered beyond a high, ragged cliff, and as one of the monstrosities leaped, it appeared almost as if it had jumped directly from the dark, cloudy formation of the distant dark Nebula.

Matson still lay prone, where he had fallen. Through the glassite, I saw

that his eyes were closed, though his lips moved feebly, as though he were moaning. I clutched the metallic suiting that housed his body, bent erect with its weight across my shoulder.

Elan came out of her stupor, induced by our unexpected encounter with the unfortunate Flare, and had by this time drawn her ray-gun. She stood at the side of the airlock, and fired upon the nearest of the poison planet's denizens. The discharge leaped out, but gave no evidence of taking effect upon the advancing horde. Obviously, the physiochemical transformation that affected terrestrial matter was not manifest here upon a world where the elements themselves might differ to some extent.

PLUNGING through the airlock with the woman close at my heels, I lowered Thorin Matson to the flooring, hurriedly reached for the wrenched controls. Luckily, I was able to throw the full accelerating force of the rear blasts wide open, and our vessel jerked somewhat erratically out into the depths of space.

It was with vast relief that we witnessed the dark world vanishing behind us. Elan divested her father of the metallin suiting. He lay in a queer stupor, and the girl began to cry hysterically. That, more than anything, acted to revive him.

"Vast beyond concept," he muttered, and came to stand at my side. He peered out at the gathering darkness of the Dark Horse Nebula, and as our space-ship plunged down and on, it seemed that we scarcely lived or breathed. "A mass so vast that even light is warped back. It must be so."

Even as he peered the dark curtain of the black nebula rushed upward. What was it to be? What were these dark nebulae, these so-called "coal-sacks" or "sink-holes" in space? Would

(Please turn to page 127)

(Continued from page 6)

WE GATHER THAT THIS MAN LIKES PAUL

Dear Editor:

This letter is sent after the heat of your contest is over to express some sincere criticism. If you must have stories with human-interest have them like Williamson's "The Dead Spot"—not like "The Time Trap," by Henry Kuttner. I would prefer a balance like "Exodus" by Arthur J. Burks which was, by the way, better if possible, than its predecessor. Let's have more stories by Keller. Another suggestion, have many interplanetary yarns.

The cover by Paul was excellent. I certainly am glad you were able to secure him for your magazine. I would like to see Paul as the sole illustrator for MARVEL SCIENCE STORIES.

One of your best features is "Excursion to Possibility." Keep Dale for more of these. Paul's illustration for this was perfect as were his other two illustrations. Give us more Paul.

I noticed two other departments, "What's Your Question?" and "What's Your Answer?" (Please have Paul do another cut for these if you are going to continue them) or in the place of these two departments would you please have a department for the letters of the readers? If you use this suggestion I wish you would let Paul do the cut. So as to conserve space you could print your departments in smaller print like you have on your page of contents.

As a parting shot, let me say to keep up the good work on the covers and always have Paul do them.

Herbert Cummings

7015 Corbitt Ave., University City, Mo.

MASTERPIECE OF SCIENCE FICTION

Dear Editor:

I have been reading science-fiction for many years and when I first laid eyes on your magazine, I must admit, I was slightly skeptical. After all, it has been my experience to learn that new publications seem to start off on the wrong foot. Their stories are hackneyed masses of words and smack strongly of plagiarism. But not so with MARVEL SCIENCE STORIES! It was pure delight to read through a new magazine that already started off near—if not with—perfection.

In the first issue I found "Survival" truly a mighty and gripping story. Combined with science was a strain of human interest that made it what it is—a masterpiece of scientific literature. These two qualities—science and human interest—are extremely potent when used by masters. Leave one out, and use only science or human interest, and you have nothing but dullness. The cover illustration was fascinating. It compelled one to find out what lay behind its portrayal.

In regard to your future policy, editor, I

have only one complaint. I believe 50,000 words for one story is too much. Cut the leading story down to something like 30,000 words, and you will have a magazine to be proud of.

E. Z. Elberg

392 South Fifth St., Brooklyn, N. Y.

ANOTHER VOTE FOR PAUL

Dear Editor:

I would like to have a year's subscription to your swell new magazine, MARVEL SCIENCE STORIES. May I also request that you send me your first issue, for I have just finished the second, and am so enthused that I would like very much to start a library including all the coming issues, along with the very first.

Please keep up the splendid work as to the two book-length features, coupled with the interesting drawings of the one and only Paul.

I have only one criticism to make, and that concerns the last story, "The Time Trap" by Henry Kuttner; it was just a trifle too romantic to suit my tastes.

Rob Rodiack

2411 Ocean Ave., San Francisco, Calif.

FIVE BOUQUETS AND A BRICKBAT

Dear Editor:

Once again, after having secured a current copy of MARVEL SCIENCE STORIES, I am writing to express my own particular opinion of your magazine.

First of all let me congratulate you upon one main thing: You have brought back to the pages of science fiction one of the best loved of its characters. I am referring to that great artist, Frank R. Paul.

The sight of his name written upon the drawings literally brought tears to my eyes. If the pages were void of stories it would still be worth the price to see his unparalleled pictures.

Now let me list the stories as I see them in their order of value and interest.

No. 1. The "Dead Spot," by Jack Williamson.

This author is in my estimation the third best science fiction writer in the field. His plots are always distinctly original, they contain a smoothness of prose that is hard to equal, and his stories are never drawn out to the point of boredom.

No. 2. "Exodus," by Arthur J. Burks.

Thank you very much for the stirring sequel to "Survival." Mr. Burks has outdone his original story in every detail. As I wrote in my previous letter, Mr. Burks is excellent in the field of adventure, and his descriptive sense is really remarkable. His only trouble might lie in the fact that he sometimes carries out his descriptive ability a little bit too far, not often you understand, but merely occasionally. Of course, this is merely a matter of opinion.

No. 3. "The Thirty and One," by David H. Keller.

(Please turn to page 128)



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ANSWERS TO QUESTIONS ON PAGE 104

1. A mirage is an optical illusion (1 point) occurring with considerable temperature differences between lower and higher strata of air (3 points more); an ephemeris is an astronomical almanac, a table showing the calculated positions and motions of heavenly bodies (4 points for either definition).

2. Both are angle measuring instruments (4 points). A sextant is used to measure angular distance, to determine latitude at sea by taking the Sun's altitude at noon (3 points for either). A theodolite measures both horizontal and vertical angles (3 points).

3. A glass-windowed tank in which the tracks of cosmic rays can be seen or photographed as they serve as nuclei for the condensation of water vapor (10 points).

4. All are meteorites (4 points); siderites are iron meteorites (2 points), aerolites stony (2 points), and siderolites stony-iron (2 points).

5. Apparent motion relative to other stars (5 points).

6. The Earth rotates on its axis (1 point) at approximately one thousand miles per hour (1 point); it revolves around the Sun, or the center of gravity of the Sun-Earth system, 260 miles from the center of the Sun (1 point for either) at 18.5 miles per second (4 points if within five-tenths); it also revolves with the Sun around the center of gravity of our galactic system (3 points) at a speed estimated between 50 and 75 miles per second (2 points); and finally as a member of the galactic system revolves around the center of mass of the Universe (2 points) at between 200 and 250 miles per second (2 points).

7. A rule which states that the distances of the successive planets from the Sun follow a regular arithmetical progression (5 points). To the distance of Mercury from the Sun, expressed as .4 of an astronomic unit (the mean distance of the Earth from the Sun, 92,900,000 miles), add .3 to arrive at the distance of Venus, .6 for the Earth, 1.2 for Mars, and so on up, including the asteroids as a unit (5 points more).

8. Both are the stripped nuclei of atoms (4 points) and are positively charged (2 points more); but an alpha particle is the nucleus of a helium atom (3 points), while a proton is the nucleus of a hydrogen atom (3 points).

9. A diopter is a unit of measure of the refracting power of a lens (2 points) and expresses that power of one with a focal length of one meter (2 points more); a helicopter is a flying machine (1 point) sustained by propellers turning on vertical axes (1 point more); a dendroheliconometer is an instrument for measuring the width of tree growing rings (2 points).

10. .55 for the Earth (2 points); 1.4 for the Sun (2 points if within one-tenth); Mercury is tops (2 points) with 12.5 (2 points more if within five-tenths); Saturn brings up the rear (2 points) with .7 (2 points more if within two-tenths).

(Continued from page 123)

it be a misty curtain of meteoritic particles? A gaseous screen? Or was it as old Thorin Matson believed?

Time passed with inexorable slowness. The dark mists of the nebula became ghostly phosphorescent. Tiny motes swam out of the blackness, shimmered for a time, and gradually took on the shapes of new, strange stars. The old familiar universe was gone, had been swallowed into nothingness. Across what seemed an infinite distance, a gigantic sun glowered, like a huge red eye. Yet on the outer edges of the inner circumference, where the light rays bent back upon themselves toward the all-powerful pull of the central mass, swung smaller stars, and most blessed of all, tiny fragmental planets.

"A universe within a universe," old Thorin Matson was saying as he stood in a wondrous trance. "Here laws similar to those of outer space prevail. Can it be that the outer cosmos is something such as this, a mass-warped universe in a vastly huger existence beyond?"

"Science has never denied that such tremendous masses exist, but if they do, then surrounding space will be warped, and it will create a new space of itself. The gravitational attraction would be so enormous as to absorb light rays through the dimension-warp.

"Light, absorbed from large contiguous areas, would appear as blotches of diffuse darkness, and these are what we of earth call dark nebulae."

He was as unaware of us two who stood before the outer imminence as we were of him. Arm in arm, we had come into the possession of something that was more precious to us than universe or galaxies—for together we looked out upon habitable worlds—and a future life for creation as we knew it.



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Find out—at my risk! Right in first 7 days I'll start to PROVE I can turn YOU into a man of might and muscle. And it will be the kind of PROOF you (and anyone else) can SEE, FEEL, MEASURE with a tape!

My FREE BOOK tells about my amazing 7-DAY TRIAL OFFER—an offer no other instructor has ever DARED make! If YOU want smashing strength, big muscles, glowing health—I'll show you results QUICK!

FREE BOOK

I myself was once a 97-pound weakling—sickly, half-sleezy. Then I discovered "Dynamic Tension." And I twice won—against all comers—the title, "The World's Most Perfectly Developed Man!"

I have no use for apparatus. "Dynamic Tension" ALONE (right as your own bones) will start new inches of massive power pushing out your chest—build up your shoulders to chameleon bulkiness—out regular mountains of muscle on youriceps—free you of constipation, pimples—make those stomach muscles of yours hard ridges!

Make me PROVE IT! Gamble a postage stamp. Send coupon for my FREE BOOK AT ONCE! Address me personally: Charles Atlas, Dept. 14512, 115 East 23rd Street, New York, N. Y.

**STERLING
SILVER
CUP
BRING
GIVEN
AWAY**



This valuable cup, of solid sterling silver stands about 12 inches high on a black mahogany base. I will award it, engraved, to my pupil who makes the most improvement in his development within the next three months.

**CHARLES ATLAS, Dept. 14512
115 East 23rd Street, New York, N. Y.**

I want proof that DYNAMIC TENSION will make a new man of me—give me a healthy, husky body and big muscle development. Send me your free book, "Elevating Health and Strength"—and full details of your 7-Day Trial Offer.

Name (Please print or write plainly)

Address

City..... State.....

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1. The famous Brooks Appliance (which embodies the Air-Cushion Principle) will hold your reducible rupture in the rigid position to give Nature the greatest chance to strengthen the weakened muscles.
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State whether for Man ☐ Woman ☐ or Child ☐

